United States Department of Agriculture

Brebner Flat Project

Environmental Assessment

Forest Service Idaho Panhandle National Forests St. Joe River District June 2019

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Introduction

The Forest Service is proposing to use a variety of vegetation management techniques to improve forest stand resilience and reduce wildfire intensity on 1,719 acres of the St. Joe Ranger District of the Idaho Panhandle National Forest.

The Forest Service prepared this environmental assessment to determine whether implementation of the proposed activities may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this environmental assessment, the Forest Service is fulfilling agency policy and direction to comply with the National Environmental Policy Act. For more details of the proposed action, see the Proposed Action and Alternatives section of this document.

Supporting resource reports, references, and biological assessments are incorporated by reference into this document. These documents are part of the project record and are available upon request.

Authority

This project has been designed to comply with the Idaho Panhandle National Forests Land Management Plan (or "forest plan"), which provides direction on desired conditions as well as standards and guidelines for the protection and management of various national forest resources.

Proposed Project Location

The 11,779-acre Brebner Flat project area is directly south of Avery Idaho in Shoshone County (figure 1). The project includes the Theriault Creek, Kelly Creek, Williams Creek, and Siwash Creek drainages within the St Joe River watershed. The legal description is within all or portions: T45N, R5E, Sections 13,14,16,22,24,26,28,34,35,36 T44N, R5E, Sections 1,2,11,12 and T17N, R32W, Sections 30, 31 Boise Meridian. A large-scale map and other documents are available on the project website: https://www.fs.usda.gov/project/?project=53048

Forest Plan Management Areas

The project area is within Management Area (MA) 6 General Forest as designated by the forest plan (8,129 acres, or 93 percent of National Forest System land in the project area), but does not include adjacent sections of private timber company lands and the wild and scenic river corridor (MA 2a).

Most of MA 6 consists of relatively large areas with roads, trails, and structures, as well as signs of past and ongoing forest vegetation management activities. This management area provides a variety of recreation opportunities, including motorized and nonmotorized activities.

Most of the wildland-urban interface on the Idaho Panhandle occurs within MA 6 and activities designed to reduce hazardous fuels are common. Vegetation and watershed restoration is accomplished predominantly through active management. Evidence of past management activities vary across the landscape, but are generally more noticeable in this management area than others.

Many of the acres within this management area are suitable for the production of timber on a regulated basis, providing wood fiber in response to regional and national demand. Old growth stands and riparian areas are not managed for timber production.

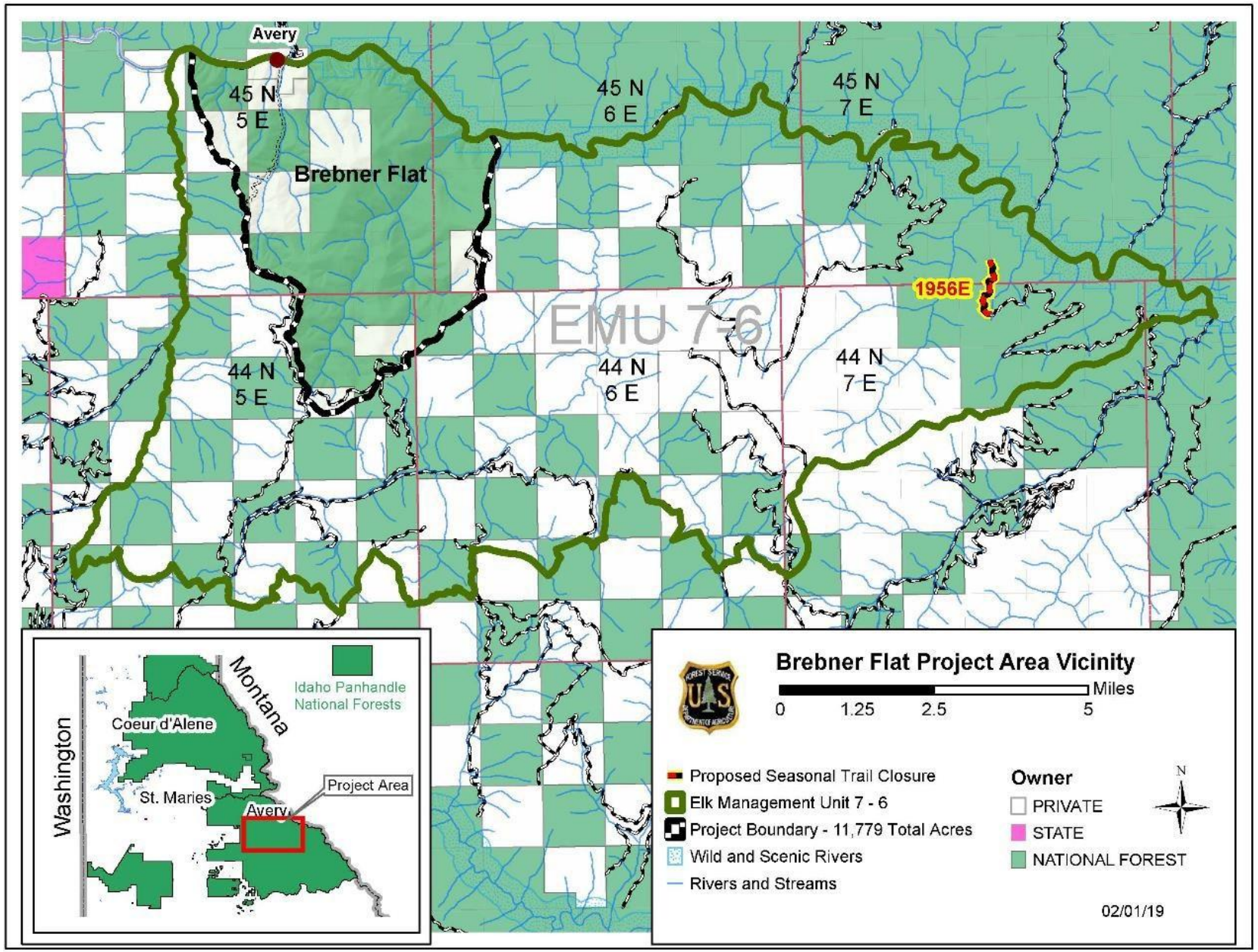

Figure 1. Location of the proposed project area

Need for the Proposal

There are three focuses of this project:

- Improve forest health and increase vegetation resilience to large disturbances such as severe fire and insect or disease outbreaks
- Provide sustainable use of natural resources and benefits for local communities
- Reduce hazardous fuels to lessen the severity of wildfires and to enable safe fire suppression efforts

Improve Forest Vegetation Resilience

The primary focus of the Brebner Flat Project is to address forest health within the project area and to improve resilience to drought, wildfire, and insect and disease outbreaks by increasing long-lived, early seral species (ponderosa pine, western larch, and western white pine) on the landscape.

Direction in the forest plan for the Idaho Panhandle National Forest is to achieve desired conditions of more forest dominated by western white pine, ponderosa pine, and western larch and less of the forest dominated by grand fir, Douglas-fir, and lodgepole pine (FW-DC-VEG-01), with an objective of having more resilient forest conditions (FW-OBJ-VEG-01, FW-DC-VEG- 06).

Current Vegetation Conditions

Over time, forest vegetation in the Brebner Flat project area has changed from the natural range of variation due to a combination of fire suppression, introduction of white pine blister rust, and past management practices. White pine was a more prevalent component of the forests in the area before the introduction of white pine blister rust and subsequent white pine salvage operations.

Additionally, the stand-replacing fires of 1910 and 1934, along with the resulting focus on fire suppression in subsequent decades, further reduced the presence of white pine, western larch, and ponderosa pine on the landscape and they were replaced by more shade-tolerant species such as grand fir, Douglas-fir, and lodgepole pine.

This change in stand composition does not reflect the desired condition as described in the forest plan, and has made these stands more susceptible to insects, disease and related tree mortality. In addition, this change in composition and lack of disturbances such as wildfire has resulted in a lack of desired structural diversity, further contributing to the vulnerability of the forest to succumb to insect and disease outbreaks and high-severity wildfires.

Further complicating these conditions are root diseases prevalent in the fir-dominated stands, and over mature lodgepole pine stands that are infested by (or are considered at high risk for) mountain pine beetle: a trend that is expected to continue into the near future.

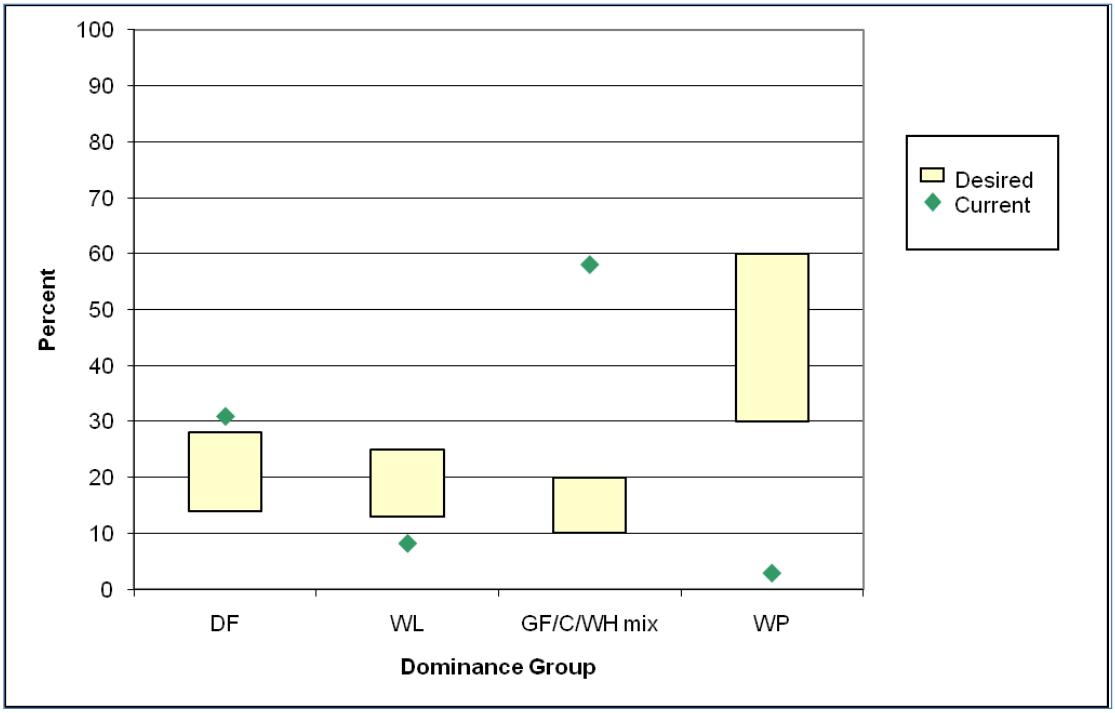

Figure 2. Desired (historic range) and current forestwide composition by dominance group for the warm/moist biophysical setting (forest plan FEIS, page 94)

There is a need to manage the landscape arrangement of forest structure and age class on lands within the Brebner Flat project area. This may be accomplished by matching the scale and spatial extent of treatments to the scale and spatial extent of the ongoing insect and disease problems. Developing large patches over 40 acres in size of conifer species that are resistant to drought, insects, disease and wildfire would contribute to the development of a resilient landscape that meets multiple resource objectives. Smaller-sized patches have an increase in edge and decrease interior habitat; therefore, these types of patches have become more fragmented (IPNF FEIS 2013). Concentrating openings in large, contiguous areas would minimize fragmentation while increasing the size of patches in the young structure class or seedling/sapling stage.

Increasing the average patch size for seedling/sapling sized trees is important for regenerating desired early seral species (ponderosa pine, western larch, and western white pine) that are more resilient to disturbances.

While root diseases and mountain pine beetle are introducing some variety, these agents act differently than fire in that they are continually causing tree mortality rather than in a distinct event, and are less likely to promote the more resilient, long-lived, early seral species. Over time, mountain pine beetles and root diseases reduce canopy cover and it is unlikely that most of the mid-seral stands will reach an old growth condition or maintain it for a long period of time.

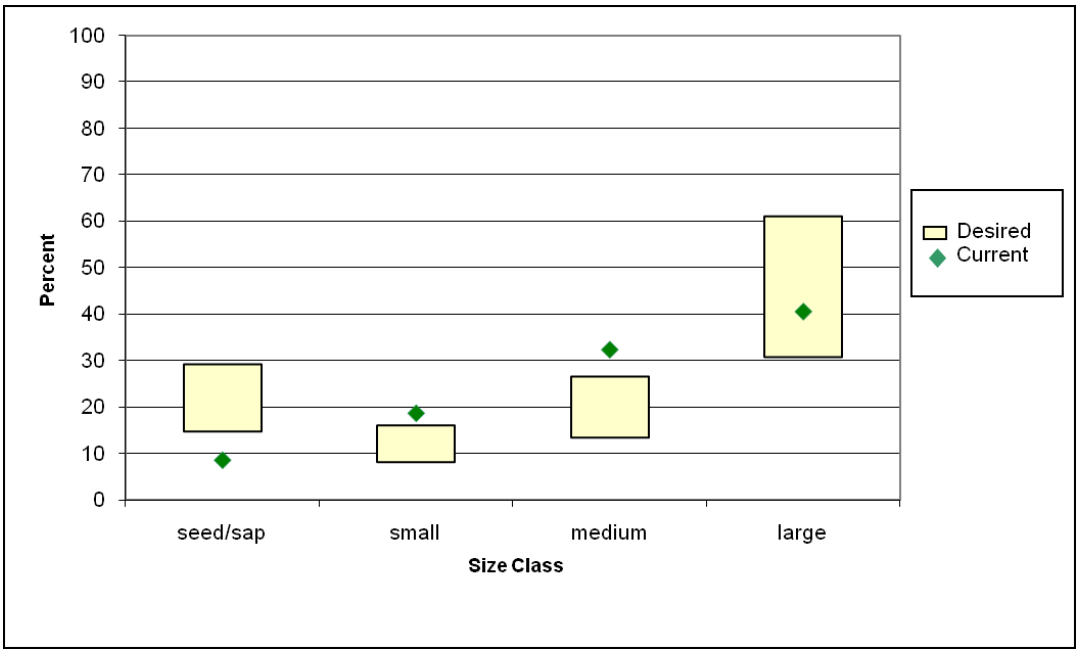

Figure 3. Desired (historic range) and current forestwide structure by size class for the warm/moist biophysical setting (forest plan FEIS, page 95)

For these reasons, we want to improve forest landscape resiliency by promoting forest composition and structure that best resist insects, disease, and drought. Specifically, we want to:

- Increase the number of acres where western white pine, western larch and ponderosa pine are major components
- Increase the patch size of forest openings to allow growing conditions beneficial to western white pine, western larch and ponderosa pine.
- Create more diversity in age classes across the project area.

Economic Benefits

The project would address local and regional socio-economic interests by contributing to sustainable use of natural resources and producing benefits for local communities. Outputs would help create or maintain jobs and income in the counties surrounding the Idaho Panhandle National Forests, promote stability in the local economy, and help maintain quality of life in local communities. The project would address the following social and economic goals and desired conditions of the 2015 forest plan:

GOAL-SES-01: Contribute to the social and economic well-being of local communities by promoting sustainable use of renewable natural resources. Provide timber for commercial harvest, forage for livestock grazing, opportunities for gathering firewood and other special forest products, permitted recreation residences, and settings for recreation consistent with goals for watershed health, sustainable ecosystems, biodiversity, and scenic/recreation opportunities.

FW-DC-SES-01: Outputs and values generated by the Idaho Panhandle National Forests contribute to sustaining social and economic systems.

FW-DC-SES-02: The outputs and values provided by the Idaho Panhandle National Forests contribute to the local economy through the generation of jobs and income while creating products for use, both nationally and locally. Jobs and income generated by the activities and outputs from national forest management remain stable, contributing to the functional economy surrounding the national forest lands.

FW-DC-SES-03: The outputs and values provided by the Idaho Panhandle National Forest contribute to community stability or growth and the quality of lifestyles in the plan area.

Hazardous Fuels Reduction

A need exists to reduce hazardous fuels and the threat of wildland fire and to allow for more safe and effective fire management in the Brebner Flat project area. The town of Avery and Forest Highway 50, the main ingress/egress road along the St. Joe River for residents and first responders in the event of an emergency, lie along the northern boundary of the project area. Shoshone County has identified this as an area of concern in their Community Wildfire Protection Plan. Approximately four sections of privately owned timberland are intermixed with the public timberland in the Brebner Flat project area. These sections are in various stages of timber production and are valued by their owners for commercial value now and into the future. Areas along National Forest System land boundaries adjacent to private land could benefit from fuels reduction in the form of timber harvest and removal.

The project would address the following desired conditions and guidelines from the forest plan:

FW-DC-SES-04: To the extent possible, the Forest contributes to the protection of communities and individuals from wildfire within the limits of firefighter safety and budgets.

MA6-GDL-FIRE-01: Fuels are reduced, particularly within the wildland urban interface, to reduce the threat of wildland fire.

Public Involvement

We notified the public, local governments, organizations, agencies, and Tribes of our proposal in February 2018 through mailings, a legal ad, newspaper articles, and meetings. Copies of the scoping letter, legal ad, and other materials are provided on the project webpage at https://www.fs.usda.gov/project/?project=53048. We received comments from Idaho Department of Parks and Recreation, Idaho Department of Lands, Idaho Department of Fish and Game, Shoshone Benewah Forest Health Collaborative, Benewah County, American Forest Resource Council, Idaho Forest Group, The Idaho Conservation League, the Kootenai Environmental Alliance and six members of the public.

Comments received during our initial public comment period (also referred to as “scoping”) shared opinions that included, the national forest should not be actively managed, but be left to self-manage, that national forests should be actively managed to increase timber harvest, and that management of national forest land should not reduce elk security.

Based on comments received on our proposed action, we determined there were no issues raised that resulted in development of additional alternatives due to unresolved conflicts. Therefore, we are analyzing the effects of no action and the proposed action on resources of concern in the Brebner Flat project area.

Proposed Action and Alternatives

No Action

No action addresses public comments that stated proposed treatments were not necessary or would not be effective. Including this alternative in our analysis also helps us compare environmental conditions and trends that exist in the project area with how they would change if we actively manage the area.

With no action, existing approved management of the Brebner Flat project area would continue but none of the activities proposed for this project would occur. Insect and disease in stands would increase, stand composition and structure would become more homogenous and wildfire behavior would likely increase due to the increase in fuels and stand composition.

The no-action alternative would not prevent activities already approved in this area or activities planned for separate projects. Fire suppression, road maintenance, and recreation use would continue. A list of ongoing activities that would continue independent of which alternative the responsible official chooses is located in the project record.

Proposed Action

The project interdisciplinary team developed the proposed action in response to the need for action in this area. Since the proposal was presented to the public in February of 2018, the following changes were made: Minor reductions in acreages of regeneration harvest and changes to the proposed treatment locations were made based on further field reconnaissance, logging system modifications, and further refinement of data. Also, a previously proposed amendment to the forest plan to address maintaining elk security guidelines is no longer needed because we changed the timing of motorized access on a trail to address elk security impacts (page 28).

The proposed action promotes forest conditions that reduce fire hazard and improve forest landscape resiliency by creating forest compositions and structures that best resist insects and diseases on National Forest System lands. The proposed action is also designed to reduce forest fuels and the potential impacts of wildfire to assist fire suppression efforts, and protect resources and private land values in and around the project area.

The activities that would occur under the proposed action are presented below. Tables are provided to summarize some of the actions and additional tables and maps can be found in the appendix.

Vegetation Treatments

We are proposing regeneration harvest treatments on about 1,719 acres, where the more resilient and longer-lived tree species, such as western larch, western white pine, or ponderosa pine, are a minor component in the stand. Regeneration harvest treatments would include seedtree, clearcut, and shelterwood methods, all with reserves of trees containing desired trees left on site (table 1). Reserve trees would provide seed to supplement the planned plantings, future snags, some ground shading, wildlife habitat, and coarse woody debris for soil productivity. Timber harvest would occur in stands where species of trees most susceptible to root disease and insect infestations are dominant. No timber harvest would occur in old growth or in stands where timber harvest has occurred relatively recently. Riparian areas, wildlife buffers, and the wild and scenic river corridor were not proposed for timber harvest.

Table 1. Proposed vegetation treatments

Silvicultural Treatment/Activity	Proposed Acres
Clearcut Harvest (with reserves)	618
Seed-tree Harvest (with reserves)	273
Irregular Shelterwood/Seed Tree (with reserves)	260
Irregular Shelterwood (with reserves)	568
Total	**1,719**

Objectives for treatments in the forest stands include the following:

- Decrease the current levels of insect and disease to increase forest health and resiliency across the project area through commercial timber harvest, prescribed burning, and mastication on 1,719 acres.
- Reforest harvested areas with western white pine, ponderosa pine and western larch seedlings to restore more stands to historical proportions of desirable species.
- Retain mature forests that have the potential to become old growth in the future.

- Create a range of patch sizes with a range of successional stages, densities, and compositions.

Benefits of vegetation treatments would also include providing jobs and forest products to local communities. Timber harvest is estimated to produce 23 million board feet.

Opening Sizes

Table 2. Proposed openings that would exceed 40 acres

Large Group Opening Number[1]	Gross Estimated Opening Acres[1]	Proposed Unit Numbers in Group
Block 1	543	19b_2, 19b_3, 19c, 34a, 34b, 35a, 36a, 37b_2, 41b and 22a, 22b
Block 2	92	29a_1, 29b
Block 3	91	23a, 23b, 38c
Block 4	58	14b
Block 5	46	30a, 30b_1, 30b_2
Block 6	51	21a, 21b
Block 7	42	20a, 20b_1, 20b_2
Block 8	44	8a, 8b_1, 8b_2
Block 9	333	13a, 13b_1, 13b_2, 13c
Block 10	44	29a_3, 29b_6, 29c
Total	**1,344**	

1. These acre amounts include reserve areas within group openings; e.g. riparian areas, which would not be treated.

Fuel Reduction Activities

Surface fuels and canopy densities would be reduced on 1,719 acres to create a lower intensity and lower severity fire environment using the treatments shown in table 3. These treatments would follow the commercial harvest.

Table 3. Proposed fuel reduction activities

Post-Harvest, and Vegetation Treatment/Activity	Proposed Acres
Grapple Pile and Burn (acres)	582
Underburning (acres)	1,137
Total Vegetation Treatments (acres)	**1,719**

Debris left from logging activities would be treated through prescribed underburning, machine piling, whole-tree yarding, or a combination of these treatment options. In machine-piled units, only fuels in excess of what is required to meet coarse woody debris and soil productivity objectives would be piled.

Reforestation

After harvest, fuel reduction, and site preparation activities are completed, blister rust-resistant white pine, western larch and/or ponderosa pine would be planted in combinations appropriate for individual stands. Western red cedar, ponderosa pine, Engelmann spruce and hardwoods would be included in the planting mix where appropriate. Reforesting with native tree species would hasten and enhance the overall recovery process, meet restoration objectives, and trend the vegetation component toward desired future conditions.

How Trees Would Be Removed (Logging Systems)

Where trees to be removed have commercial value, we would use various types of equipment based on the terrain and access constraints. Skyline yarding would be used on steep terrain (figure 4). Tractor yarding would be used on flat to gentle slopes, and a combination of skyline and tractor yarding would be used where slopes vary. See table 4 for a list of systems by acreage.

Table 4. Proposed logging systems

Logging System Type	Proposed Action (acres)
Off Road Skyline	582
Skyline	898
Ground Based	239
Total	1,719

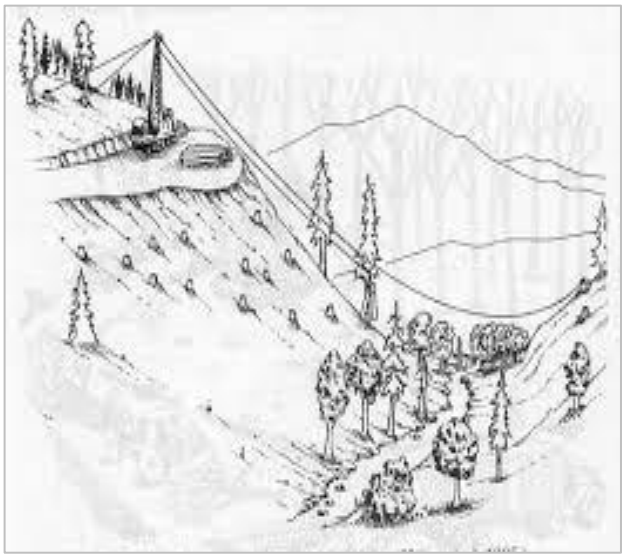

Figure 4. Illustration of a skyline yarding system

Transportation System Management

A travel analysis process was conducted to determine a transportation system for the project. To facilitate the proposed timber harvest, new system and temporary roads would be constructed, existing stored system roads would be reconstructed, and some nonsystem road segments would be added to the National Forest System road inventory. After project activities, some road segments would be decommissioned (removed from the National Forest Road System), and others would remain on the system but be stored for future use. General road maintenance would also occur on all existing open roads used for project activities. See appendix B for tables that list specific road segments.

Table 5. Proposed road management activities

Road Management Activities	Proposed Miles
New road construction	2.02
Nonsystem roads to be added to the National Forest System	1.36
Temporary road construction	4.24
Road reconstruction	2.96
Road maintenance	36.44
Nonsystem road decommissioning	1.30
Road storage	8.09

New Road Construction

Approximately 2 miles of new road construction would occur with 4 new roads to facilitate the safe and efficient haul of logs from the proposed treatment areas. After planting is complete in the harvest units, the roads would be hydrologically stabilized and stored for future administrative use. New permanent roads would be accessible for administrative motorized use only and would be closed to public motorized use with gates or barriers.

In addition, 1 mile of nonsystem road segments in the project area would be used for the project and then added to the National Forest Transportation System. Of these segments, one would be stored for future use, and two would be closed with a gate.

Temporary Roads

Approximately 4 miles of temporary roads would be constructed to access treatment units. Temporary roads and landings would generally be located on dry ridgetops and designed to standards appropriate for the intended uses, considering safety, cost of transportation, and potential to impact resources[2] and to make progress toward achieving forest plan desired conditions (FW-DC-AR-07).

At the completion of the project, temporary roads would be decompacted, recontoured to the approximate shape of the surrounding terrain, and seeded or covered with logging slash or other debris to prevent erosion and to accelerate hydrologic and vegetative recovery.

System Road Reconstruction

Approximately 3 miles of existing stored roads would be reconstructed to a standard suitable for safe and efficient hauling of timber and would meet current Idaho forest practices standards for water quality. Reconstruction activities would include brushing, short stretches of realignment, road widening, the addition of turnouts, improvement and/or addition of drainage structures.

Road Maintenance

Approximately 36 miles of road maintenance (some of the 390 road segments are located outside the project boundary) would occur to facilitate the safe and efficient haul of logs from the proposed treatment areas. Maintenance activities would include clearing brush from the road shoulders to improve sight distance, blading and shaping the road, cleaning ditches and culverts, improving drainage structures, and adding gravel to road surfaces. Spot reconstruction would be necessary to address drainage and/or safety issues on portions of some roads proposed for maintenance.

Road Storage

Following vegetation management and fuel reduction activities, about 8 miles of administrative roads would be put into long-term storage. Roads placed in storage would no longer be drivable. They would be blocked with a gate, earthen berm or have a short section of full recontouring to match the original slope of the land. High-risk culverts or drainage structures that are causing appreciable sedimentation would be removed to make the road prisms hydrologically inert.[3]

Potentially unstable slopes would be recontoured, running surfaces would be ripped to encourage water infiltration and revegetation, cross ditches would be installed, large woody debris would be placed, and exposed soils would be revegetated. Stored roads would remain as part of the National Forest Transportation System and would be reopened as needed in the future.

[2] 16 U.S. Code 1608(b) and (c)

[3] A road that is hydrologically inert is a road that no longer concentrates water, has measurably improved infiltration (reduced compaction) and poses little or no risk for future erosion or mass failures.

Road Decommissioning

Approximately 1 mile of nonsystem roads, generally old skid trails or brushed-in spurs that are mostly impassable and do not provide legal public access would be decommissioned. Roads are decommissioned when they are no longer needed for future management activities.

Decommissioning roads reduces road maintenance costs and improves wildlife security. As with road storage, decommissioning would remove any resource risks associated with these routes (such as failing culverts or potential erosion), and the road entrance would be made impassable to discourage illegal use where applicable.

Motorized Trail System

Motorized trail 1956E is outside the project area boundary but within Elk Management Unit 7-6, which encompasses the project boundary. The motorized trail, which is designed for off-highway vehicles less than 50 inches in width, would change from no timing restrictions to a seasonal restriction of use between September 3 and December 16 each year to enhance elk security. The restriction would apply between milepost 11.2 and 12.3 for a total of 1.07 miles of trail affected. The trail would be signed during the seasonal restriction.

Design Features to Protect Resources

Design features are activities that will be implemented throughout the project to avoid or mitigate potential project-related impacts. In addition, the project has been designed to comply with forest plan standards and guidelines that help minimize impacts to specific resources. See appendix C for more information.

Environmental Impacts of the Proposed Action

The resource sections analyzed are those that are likely to be affected by the proposed action in some way. Resources that would not be affected because they will be completely protected or avoided are not discussed here. Further information about resources not discussed and more detailed reports of all resources analyzed are available from the project record.

Changes to Tree Species Composition and Structure

Summary

Proposed treatments would increase the numbers of desirable seral tree species in the project area that are more resilient to insects and diseases, large-scale disturbances like wildfire, and climate variability. These actions would also increase the average patch size in the areas being treatedby 109 percent. The amount of acres in the early structural stage would be increased by 34 percent, as well as both the amount and size of early-seral patches. Desirable structural elements (particularly existing large trees) would be maintained. Desirable individual leave trees are healthy western white pine, western larch and ponderosa pine, and, where appropriate, other fire- surviving relic trees. In the limited areas within regeneration units with concentrations of healthy desirable trees, trees would be thinned, removing less desirable trees that compete with desirable trees. Over time, these ever-larger trees would provide a seed source for continued natural regeneration of desired seral species, large snags when these trees die, and eventually coarse woody debris. Over the planning horizon of 60 years, the units in the project area would be enhanced by the proposed vegetation treatments in ways that meet objectives previously discussed (see Need for the Proposal section on page 3.

Analysis

This analysis describes the efficacy of the project in terms of potential effects of no action and the proposed action on the existing forest species composition and forest structure within the project area, with the aim of converting stands to trend the landscape toward its historic range of variation. Measures include the following on National Forest System lands in the project area:

- Acres of stands converted from late seral or climax-dominant species to early seral-dominant species
- Percent of area in each stand structure as defined by size class
- Percent change in patch size

These measures are designed to determine how well the project achieves the need as well as goals, objectives, desired conditions, and guidelines outlined for vegetation in the forest plan.

The first resource element and indicator is measured by the number of acres converted from being dominated by late-seral or climax species to being dominated by early-seral species. Species dominance is calculated by the percentage of square feet of basal area for each of the early- and late-seral species groups. Effects to species composition was calculated using number of acres where the preponderance of basal area has been changed from late- to early-seral species dominance groups.

Table 6. Dominant species before and after treatment by percent and acres for the project area (acres are shown in brackets)

Measure	White Pine	Western Larch	Ponderosa Pine	Grand Fir/Western Hemlock/ Western Red Cedar	Douglas-fir	Lodgepole Pine	Subalpine fir/Mix
Acres before treatment	Not applicable[1]	Not applicable[1]	0.4% [22]	65.8% [3,326]	7.3% [368]	24.2% [1,221]	2.2% [111]
Acres after treatment [2]	13.6% [688]	20.4% [1,031]	0.4% [22]	44.2% [2,231]	4.4% [223]	14.9% [754]	1.9% [99]

1. None of the existing stands in the project area is considered western white pine or western larch dominated.
2. About 24 percent of the project area is not covered by stand exams. Calculated dominance group and structural size class acres for the project area were extrapolated and increased by a commensurate and relative 24 percent in each size class to account for this lacking data.

The second resource element and indicator measured is stand structure. The 2015 forest plan Final Environmental Impact Statement uses size class as a surrogate for structure. Existing size classes for the proposed treatment units and within the project were calculated by stand exam and then compared against the historic range of variability.

Management direction from the forest plan directs us to increase the acres of seedling/sapling and large-diameter structural classes and to simultaneously decrease the number of acres in the small- and medium-stand structure. This will help bring the future forest structural stage percentages into a closer resemblance of the desired structural stage percentages outlined in the forest plan.

For the third resource element, the desired pattern for the warm/moist biophysical setting is one where the landscape includes large distinguishable patches, with a residual structural diversity and heterogeneity both within and between patches (IPNF FEIS 2013). Forest plan direction aims to increase patch size to between 100 to 300 acres with larger ones on steep topography. Current average patch size is

approximately 31.6 acres. Treating areas larger than the current average would increase the patch size in the project area and trend towards the desired condition.

No Action

There would be no actions occurring in the project area, beyond existing approved management activities of fire suppression, road maintenance, and recreation use. Insects and disease would increase and continue to spread, late seral tree species would become more dominant, and desired size classes would decrease along with patch size, all contributing to higher fuel loads and increased wildfire severity. With no Forest Service actions to cause direct or indirect effects, there would be no cumulative effects.

The following discussion describes the predicted progression of forest vegetation conditions over time, without management activities.

Forest Composition

Barring a stand-replacing fire or disease incident, not treating the project area would result in slow, but perceptible, changes to the existing forest composition and structure. The disparity between existing and desired conditions would continue to increase. Without management of the current disease and insect activity, the rate of infestation and mortality would continue to spread and increase, leading to naturally caused openings, but along with greatly increased fuel loadings. These dead and down trees would also hinder natural regeneration as seedlings would struggle to establish with a greatly reduced seedbed and available sunlight. Any naturally occurring regeneration would likely be of undesirable late seral species, as only 0.4 percent of the existing acres is currently composed of desirable seed-producing species. Planting could not occur due to the high fuel loading and subsequent inaccessibility of the sites. This would cause the early-seral cover type conditions to fall even further below desired conditions, while the grand fir/cedar/western hemlock mix and other undesirable tree species would increase even further from the historical range of variation and desired conditions set forth in the 2015 forest plan.

Forest Structure

There would be no proposed activities to change forest structure, so differences between the existing and desired conditions would persist (table 7). As stands continue to grow over the next 10 to 20 years, the acreage of seedling/sapling-size and small-size classes would decrease as these stands grow into the medium class. Some of the stands in the large-size class would regress to the medium-size class due to mortality caused by root diseases and insects in Douglas-fir and grand fir. On grand fir habitat types, persistent root disease may result in stagnated stand development because many regenerating Douglas-fir and grand fir would die before they exceed 15 inches in diameter. In this situation, the affected stands would remain in the medium-size class for an indefinite period of time. As time progresses, forest structure would become more homogenized across the landscape.

Patch Size of Forest Openings

Without some other form of stand-replacing event, patch size would not change and the existing forest composition would continue to trend towards later-seral species. This is due to the root disease susceptibility of later-seral species. These stands would be in an "endless loop" of pockets of root-disease-induced mortality followed by the filling in of those pockets with new growth of the same root disease-susceptible species. In essence, this is a self-perpetuating problem. The seedling/sapling, small- and large-diameter-class dominated stands would continue to decline in numbers of acres. Conversely, the acres of the medium-size class would continue to increase.

Proposed Action

The treatment activities proposed are designed and intended to create conditions favorable to:

- Increase the number of acres for the establishment or continuance of stands of western

white pine and western larch, and existing stands where ponderosa pine is a dominant species.

- Increased overall patch size of forest openings.
- Increase the number of acres in the stand initiation (seedling/sapling) structure class to create more diversity in age classes.

The treatment activities would remove much of the later-seral species in the treated areas. Table 7 shows the estimated acres and proportions of dominance types following project implementation. The existing proportions of the project area by dominance type are provided in the table to facilitate direct comparison between no action and the proposed action.

Forest Composition

The proposed combination of regeneration harvest, prescribed fire, and reforestation would increase the area dominated by desirable long-lived, seral-tree species within treated stands and collectively across the project area.

Existing desirable species composition would be preserved within treatment units. Leave trees would include healthy western white pine, western larch (greater than 25 percent crown ratio), and ponderosa pine and trees that have survived past fires. Removing trees competing with these desirable stand components would improve their vigor and encourage their future growth. The largest trees of other species would be left for snag recruitment and coarse woody debris. Blister- rust-resistant western white pine and western larch seedlings would be planted following harvest and site preparation in regeneration treatment areas.

Across the project area, western white pine and western larch dominance types would increase by 1,719 acres. As also shown in table 7, there would be roughly corresponding decreases in grand fir, Douglas-fir, western hemlock, and lodgepole pine cover types.

The primary indirect benefit in the stand regeneration areas would come from the removal of root-disease-prone species and replacing those individuals with species that are resistant to root diseases. This change in species composition would break the current "self-perpetuating loop of root disease mortality." The new stands would be more stable and have the correct species mix that would enable them to grow larger trees that would last longer than the existing stands.

The forest composition changes affected by the activities proposed would enhance forest diversity, and move the dominance groups in the project area towards the desired future condition. This shift would more closely reflect historic vegetative conditions, increase resilience to insect and disease epidemics (Jain and Graham 2005), and climatic variability, and effectively increase future vegetation management options. It would also enhance the variety of habitat available to and increase the available range of future vegetation management options, such as prescribed burning, pre- commercial thinning, intermediate treatments (commercial thinning, improvement cut, salvage, or sanitation harvests), regeneration harvests (shelterwood, seed tree, or clearcut harvests), or combinations of treatments.

Table 7. Existing versus post-treatment forest structure acres and percentages by size class for the project area (acres shown in brackets)

Time Period	Seed/Sap Size Class <5" Average Diameter	Small Size Class 5–10" Average Diameter	Medium Size Class 10–15" Average Diameter	Large Size Class >15" Average Diameter
Before Treatment	Not Applicable	5.8 [295]	70.4% [3,556]	23.7% [1,197]
After Treatment	34% [1,719]	2.2% [109]	40.6% [2,051]	23.1% [1,170]

Forest Structure

Stand structures on the 1,719 acres of proposed regeneration treatment would be converted from their existing small- and medium-size classes back to the seedling/sapling class (table 7). This would effectively add 1,719 acres to the seed/sap class, which is currently deficit, moving the project area closer to the desired condition for forest structure. These 1,719 acres would have reduced fuel loading, lower canopy density, and reduced horizontal and vertical fuel continuity relative to existing stand structures. Among other benefits, these changes in fuel characteristics would result in less intense fire behavior and make a fire easier to control (see Fire and Fuels specialist report). At the project area level, the most noteworthy structural change that would result from the proposed activities would be 34 percent (1,719 acre) increase of early-seral successional forest structures.

Corresponding to this change would be a 34 percent decrease in the amount of small- and medium-sized forest structure from 76 percent of the project area to 42 percent. There would be no effect on old growth because old growth stands are not proposed for treatment.

In addition to the retention of individual trees, leave areas of diverse shapes and sizes would be retained both within, and between regeneration harvest units. These leave areas would not be limited to riparian habitat conservation areas, they would be centered on existing concentrations of large trees, large coarse woody debris, snags, seeps, rock outcroppings or other unique structural and/or habitat features. These areas would include representation of all tree species that are present in the pre-harvest stand. Retention of individual trees and untreated areas would promote the diversity of the early-successional stands that would become established (Franklin and Johnson 2011) and would provide continuity in structural, functional, and compositional elements from the pre-harvest to the post-harvest forest (Gustafsson et al. 2012).

Patch Size

As can be seen in table 8, regenerating large patches of existing forest structure and converting them to the early successional stage of stand development would increase the mean patch size. This larger mean patch size for the early successional stage represents a move towards desired conditions in the project area and towards the historic range of structural distribution at the landscape scale. This follows the recommendation from the St. Joe Geographic Assessment (USDA Forest Service 1997) to restore large-scale diversity in landscape pattern by increasing patch size of both early and late successional patches while providing for a large variety of patch sizes. Openings which exceed 40 acres in size would also allow treatment unit boundaries to follow existing vegetation patterns and breaks.

Table 8. Effects on patch size range and average acres

Time Period	Number of Stands	Stand Acre Range	Average Stand Acres
Before Treatment	113	3.5–83 acres	15.2 acres
After Treatment	54	5–578 acres	31.8 acres

Implementation of this alternative would promote the desired species, structure and range of patch sizes across the project area. Barring a stand-replacing event in the treated areas, these treatments would increase the future acreage of mature forest containing long-lived seral species in the following ways:

- Increase of 1,719 acres, or 34 percent, in species composition converted to early-seral condition
- Increase of 1,719 acres, or 34 percent, in the seed/sap structural group with a corresponding decrease from both the small and medium structural classes
- Increase in the average patch size across the treatment area of 109 percent

Cumulative Effects of the Proposed Action

We considered the effects of the cumulative actions described in the proposed action as well as future planned projects (in which there is none planned for the project area). The past regeneration harvesting that established western larch, rust resistant white pine and pre- commercial thinning and pruning that maintained larch and white pine, in combination with the proposed activities, would move the conditions of the forest vegetation within the project area closer to the desired future condition. The proposed action would reduce, mitigate, and slow the spread of insect damage and disease within stands. It has been determined that none of the effects of these actions would adversely impact the effects on forest composition, forest structure, or patch size caused by the proposed action.

Changes to Fire and Fuels

Summary

Without proposed treatments, stands in the project area would continue to progress toward less desirable species and structures, causing more accumulation of surface fuels, dead trees, and flammable canopy conditions. Modeling predicts potential severe fire conditions that would be difficult to suppress if stands go untreated. However, under the proposed action, potential flame lengths and fire intensities would decrease, as there would be fewer fuels on the ground, less canopy cover to spread fire, and a more desirable mix of tree species and structures more resilient to fire. Suppression of future wildfires would likely be safer and more successful.

Analysis

Fire behavior and severity depend on fuel properties like fuel continuity (Graham et al. 2004). A continuous closed forest canopy contributes to sustained crown fire once initiated (Scott and Reinhardt 2001). The proposed action includes large openings to promote forest conditions that reduce the risk of wildfire to National Forest System lands. The larger the openings, the more effective treatment areas are for suppression resources to engage the fire more safely and under more severe conditions. Smaller areas are subject to increased risk of spotting as there is less distance for embers to travel to reach receptive fuels (Weatherspoon and Skinner 1996, Van Wagtendonk 1996).

Regeneration harvest of units greater than 40 acres in size create more slash in the short term, but design features and compliance with the Idaho Forest Practices Act would hasten treatment of the slash, resulting in larger openings with less fuel available to wildfire. These larger harvest units would not only create fuel breaks, but also promote growth of more fire-resistant tree species in the longer term.

The analysis for fire and fuels used modeling from the Fire and Fuels Extension of the Forest Vegetation Simulator in conjunction with data gathered from field exams and weather data to assess the potential fire behavior and fire effects possible considering current and future stand conditions with typical fire season weather.

Effects to Fire and Fuels

No Action

With no timber harvest or prescribed fire, stands would continue to accelerate toward late-seral, shade-tolerant tree species that are highly susceptible to insects, disease, and fire. Mortality from insects and disease in the overstory would lead to grand fir and Douglas-fir regeneration which results in tree canopies that are closer to the ground. Combined with higher fuel loads from dead and down trees, this structure is more conducive to high-severity fire. Over time, fuel loadings would be expected to increase within the project area due to succession, root rot, and other disturbance factors, increasing the risk that a wildfire in the area would be severe.

Figure 5. Surface fuels in the Brebner Flat project area consist of dead and down trees, branches and accumulations of other vegetative material

Results of Forest Vegetation Simulator modeling in the stands support this (see project record). Figures 8-13 in the Fuels Specialist Report (p. 7) show how a potential fire in the project area is expected to behave. No-action and the proposed action were graphed for three stands, a clearcut, a shelterwood, and a seedtree, in terms of measuring changes in flame lengths, probability of torching, and crowning index.

Modeling surface flame lengths for the stands proposed for clearcut with reserves showed that without treatment between 2018 and 2090, flame lengths would be 9 feet high and greater. Higher surface flame lengths, combined with lower canopy heights and bulkier tree canopies, contribute to torching and crowning. These types of fires are typically more difficult and dangerous to suppress and result in more tree mortality than fires that do not torch and burn in the crowns. The stands proposed for seedtree and shelterwood harvests would produce flames between 3 and 4 feet and rise steadily until 2030, when flames would surpass the 4-foot mark in both.

Probability of torching (single trees engulfed in flames) in the stand proposed for clearcutting would be about 80 to 100 percent if a wildfire were to occur and would be more variable in the stands proposed for seedtree and shelterwood treatments.

Crowning (flames spreading through multiple tree crowns) could occur more readily and at significantly lower wind speeds without treatment than with the any of the three proposed treatments. Crown fires are usually stand replacing, and are more dangerous and costly to suppress.

Proposed Action

Fuel management activities in the proposed action would promote a desired condition where potential flame lengths and fire intensities decrease due to removal of fuels through timber harvest and burning. These activities would directly affect the amount and availability of fuels in the event of a wildfire. Reduced flame lengths, probability of torching, and crowning would allow for more options in fire management and increased firefighter safety during fire suppression activities.

With the introduction of more early seral species after harvest, there would be a better mix of tree species and sizes in the stands. The slash created from harvest would probably increase fire behavior if a wildfire were to start in the area prior to slash treatment, but design features and compliance with the Idaho Forest Practices Act would hasten treatment of slash and planting of trees that are more resistant to disease and fire than current conditions. Timely slash treatment, aided by a schedule of logging that allows areas to become available for fuels work as soon as possible after harvest is crucial to meeting the fuels reduction objectives of this project.

Where burning is proposed, design features would ensure attention to smoke management, including coordination with the Montana/Idaho Airshed Group. In addition to burning when dispersion is good, smoke management techniques would include reducing the amount of fuel consumed, burning before new fuels appear, and increasing combustion efficiency. According to the fuels report, modeling shows that less than half the smoke emissions would be expected from prescribed burning in the proposed action than would be produced if a wildfire were to occur and burn the untreated acres.

Proposed Action – Cumulative Effects

Past management activities such as timber harvest, prescribed burning and precommercial thinning helped to reduce fuel loadings and diversify species composition and structure on the landscape. Project activities would provide similar benefits to the project area. Wildfires will likely continue to occur into the future in the project area, with suppression being the fire management course of action due to the project area's proximity to the town of Avery and the timber values in the area, including the investment in stand development with this project. The majority of fires are likely to be lightning-caused; however, if public use increases there could be an increase in human-caused fires. It is impossible to know where or when these fires will occur.

Economic Effects

Summary

Timber management activities within the project area have the potential to impact the economic conditions of local communities and counties. A financial efficiency analysis showed that the proposed activities would result in a viable timber sale that would provide about 23 million board feet of timber (43,246 CCF or hundred cubic feet) with a present net value of about $2.0 million. The project would also contribute an estimated 67 jobs per year during the life of the project.

Analysis

The management of the natural resources on the Idaho Panhandle National Forest has the potential to affect local economies. People and economies are an important part of the ecosystem. Use of resources and recreational visitation to the national forests generate employment and income in the surrounding communities and counties. They also generate revenues returned to the Federal treasury or used to fund additional on-the-ground activities to accomplish resource management objectives.

In 2016, timber was the largest component of commodity sector employment in the impact area,[4] accounting for 13.6 percent of total employment, followed by mining 12.6 percent and agriculture at 3.3 percent of total employment. In comparison, agriculture accounted for 1.4 percent of the United States' jobs, timber accounted for 0.6 percent and mining accounted for 0.5 percent.

Project Feasibility and Financial Efficiency

Project feasibility is used to determine if a project is feasible—that is, will the timber sell, given current market conditions. The determination of project feasibility relies on a residual value[5] feasibility analysis, which takes into account logging system, timber species and quality, volume removed per acre, lumber market trends, costs for slash treatment, and the cost of specified roads, temporary roads, and road maintenance.

The financial efficiency analysis indicates that the proposed action would have a positive present net value of $2.1 million from the timber harvest with required design features. When including timber harvest and all other planned non-timber activities, the project is still financially efficient, with a present net value of $2.0 million.

Economic Impact Effects (Jobs and Labor Income)

Table 9 displays the direct, indirect and induced, and total estimates for employment (full- and part-time) and labor income that may be attributed to the proposed action. It is important to note that these may not be new jobs or income, but rather existing jobs and income in the regional economy that are supported or sustained by this project. It is anticipated that the timber harvest would occur over a seven-year period, with the restoration activities spread out over 10 years.

Table 9. Average annual employment (number of jobs) and labor income contributions from all project activities

Analysis Item	No Action	Proposed Action
Direct employment	0	28
Indirect and induced employment	0	39
Total employment	0	67
Direct labor income (thousands of 2017 dollars)	0	$1,320
Indirect and induced labor income (thousands of 2017 dollars)	0	$11,188
Total labor income (thousands of 2017 dollars)	0	$2,507

[4] The impact area for the project is the set of counties including Mineral County in Montana, and Benewah and Shoshone Counties in Idaho.
[5] Residual value is calculated as stumpage equals revenues minus costs.

Hydrology

Summary

For the Proposed Action, the analysis was conducted within the Brebner Flat project boundary. For cumulative effects, the analysis was conducted within the St. Joe - Siwash watershed boundary (HUC12 – 170103040308). The analysis was based on a 5 to 20 year recovery timeframe. Within five years, surface infiltration and surface erosion concerns should be mitigated as herbaceous vegetation reestablishes on hillslopes, road cut and fill slopes, and drainage ditches. Within 5 to 20 years, hillslope stability, snow ablation rates, runoff timing, and water yield concerns should be mitigated as tree canopies and root networks are reestablished.

With the implementation of the Proposed Action, the total cumulative effect ECA acreage is 4,049 acres which is 12.8 percent of the St. Joe – Siwash watershed, a 6.1 percent increase over the existing baseline conditions. Based on ECA modeling, no detectable increases, beyond historic variability, in peakflows would be expected from the St. Joe – Siwash watershed. Based on the Forest Plan (Appendix D) Watershed Disturbance modeling approach, the ranking for road density, stream crossing frequency, and ECA would remain at medium, low, and low, respectively.

Based on cited literature and Pfankuch stream surveys, only Blue Grouse Creek was determined to be at risk from possible increased frequency of bankfull events due to ECAs above the 20 percent threshold. As such, units 24, 25, 26, and 26B were removed from the Proposed Action. This revision to the Proposed Action resulted in the ECA for the Siwash Creek drainage, which includes Blue Grouse, dropping below the 20 percent threshold eliminating this concern.

The construction and maintenance of roads could result in sediment escaping the road buffer and being deposited in intermittent and perennial stream channels located within the project area. This would be expected to be a short-term concern peaking immediately following completion of the proposed road construction activities and decreasing incrementally to no effect within 1 to 5 years.

Based on Idaho Department of Environmental Quality (IDEQ), no stream within the Brebner Flat boundary is rated as "not supporting" in the 2014 (final) or 2016 (draft) 305(b) integrated report[6]. The St. Joe River, starting upstream from Williams Creek at the confluence of the North Fork of the St. Joe, is rated as "not supporting "cold water aquatic life due to water temperature exceedance. Kelley, Theriault, and Williams creeks discharge into this segment of the St. Joe River. No stream directly or, indirectly influenced by the Brebner Flat project area is 303(d) listed by the EPA.

Analysis

No Action

With the No Action alternative, no changes in road derived sediment, sediment transport, or surface water and subsurface water flow alterations would be expected within the Brebner Flat project area. As such, no changes to stream peak flows, peak flow timing or duration, or snow ablation (melt and evaporation), would be expected within the Brebner Flat project area resulting from Forest Service activities.

Proposed Action

Road Density

With the proposed action, road density would increase from 3.1 to 3.5, which is an 11.4 percent increase for National Forest System roads within the Brebner Flat project. The watershed disturbance rating (WDR) would remain unchanged at a moderate rating.

Stream Crossing Frequency

For existing forest service roads, the stream crossing frequency is 0.81 crossing per mile which is a moderate rating based on WDR. The stream crossing frequency would remain unchanged since no additional road-stream crossings would result.

Equivalent Clearcut Area (ECA)

Researchers have attempted to quantify the ECA method (or similar methodologies) in an attempt to evaluate watershed responses due to timber harvest. Thomas and Megahan (1998) summarized the ECA discussion well. "Given the complex nature of the effects of forest cutting and roads on streams, it is not surprising that the literature provides mixed messages about peak flow responses".

To evaluate potential impacts to streams located within the St. Joe – Siwash HUC12 watershed, select drainages were delineated within the St. Joe – Siwash watershed using USGS StreamStats for ECA analysis. Based on the worst case cumulative effects condition, the ECA analysis indicated an increase in peakflow of 16 to 33 percent could be expected in Kelley Creek, 14 to 31 percent in Theriault Creek, and 15 to 32 percent in Williams Creek. Siwash Creek ECA was below the detectable threshold for the ECA model.

This worst case analysis is based on "all" road construction and timber harvest occurring in year-one of the Proposed Action. In reality, road construction activities would precede timber harvest activities, timber harvest activities would occur in multiple years with subsequent hydrologic recovery. Table 10 summarizes the range of expected peakflow increases, by watershed, as a result of the Proposed Action timber treatments.

[6] http://www.deq.idaho.gov/media/60181779/2016-integrated-report-0718.pdf

Table 10. Summary of % peakflow increases, based on ECA, by drainage for Proposed Action

Drainage	Drainage Area (acres)	FS New (acres)	All Roads (acres)	ECA Total (acres)	ECA Total (%)	Peakflow Change (%)
Kelly Creek	2,331	481	160	672	28	12-24
Siwash Creek	5,848	738	338	1,076	18	<threshold
St. Joe Face	2,432	260	64	343	13	<threshold
Therault Creek	252	39	18	57	23	11-22
Williams Creek	918	119	63	190	20	10-20

** ECA adjustment factors (based on the amount of crown cover removed) for treatments proposed for the Brebner Flat project are clearcutting (1.0), seed-tree harvest with reserves (0.98), irregular shelterwood/seed tree with reserves (0.92 and 0.98), and irregular shelterwood with reserves (0.92).

Based on ECA, the St. Joe Face and Siwash drainages are below the detectable threshold as such, no effects beyond historic variability, would be expected. Streams located within the Kelley Creek and Williams Creek drainages could experience increased frequency of bankfull runoff events potentially resulting in an increase in the frequency of bedload scour and deposition (Olsen et al, 1997). Bankfull stage, also referred to as geomorphic effective stream discharge, is defined as the increment of stream discharge that transports the largest portion of the annual sediment load, including bed load. The effectiveness of stream flows above bankfull to move sediment and bedload are diminished as they overflow onto the floodplain which dissipates the energy of the water.

Road Sediment

With proper best management practices implementation, generated road surface sediment should be captured within the road right-of-way or within the adjacent forest litter layer (Seyedbagheri 1996, IDEQ 2016, Edwards et al. 2016). Collectively, the proposed road treatments could result in 77 tons of sediment escaping the road buffer. Typically, road surface runoff is transported and deposited in small drainage features never reaching the perennial streams. However, when a large rain or rain-on-snow event occurs, these deposited sediments could be mobilized and transported long distances. During these events, short-term impacts to surface water quality could result. The potential for short-term impacts would diminish incrementally to no effect within 1 to 5 years.

Cumulative Effects

Watershed Disturbance Rating (WDR)

To evaluate WDR for cumulative effects, the total ECA was calculated by combining the proposed timber treatments, existing and proposed road treatments, and past private land timber treatments. With the incorporation of current, past, and future activities, the cumulative effects WDR for the St. Joe – Siwash watershed for road density, stream crossing frequency, and ECA remained unchanged at medium, low, and low, respectively.

Effects to Soils

Summary

Activity units will see an increase in detrimental soil disturbance, but all will remain within the threshold set by regional soil quality standards (at least 85 percent of the area is not detrimentally disturbed). Woody debris that is deficient in some units would be increased through project design features. Soil productivity would be affected but generally maintained or improved. Activities would not occur on soils prone to

mass failure or high erosion rates.

Analysis

Timber harvest, fuel reduction activities, and road work have the potential to affect soil productivity and function. The use of mechanical equipment and prescribed fire on productive forest ground can potentially alter physical, chemical, and biological soil properties that contribute to soil productivity and function.

This analysis measured detrimental soil disturbance to determine effects to soils. Detrimental soil disturbance is reflected as a percentage of the soil surface area of a unit that has or is expected to be detrimentally disturbed. Detrimental soil disturbance is a useful approach in assessing management impacts as it encompasses a variety of effects and summarizes them in a single metric. This measure is then compared to thresholds set by Forest Service regional soil quality standards and forest plan standards and guidelines. Disturbance includes but is not limited to compaction, rutting, topsoil displacement, and soil burn severity.

Soil conditions in the units proposed for treatment in the Brebner Flat Project are as follows:

- The amount of coarse woody debris in 18 units is lower than desired conditions and guidelines specified in the forest plan.
- The potential for surface erosion is low across all units and subsurface erosion is mostly low and moderate.
- Soil productivity ratings are mostly moderate and moderate/high.
- Mass failure potential is mostly low and moderate.

No Action

With no management activities taking place within the Brebner Flat project area, detrimental soil disturbance would not increase as no mechanical harvest or thinning would take place. However, many of the units have experienced detrimental soil disturbance from previous harvest or wildfire, and the effects from those events vary by type or method of harvest and soil burn severity, respectively. With no action, soils that are already disturbed would be allowed to continue to recover slowly by varying degrees of effectiveness through decompaction by root establishment and freeze-thaw cycles, as well as accumulation of organic matter as vegetation reaches its life expectancy and is returned to the soil.

With continued fire suppression, fuel loadings would continue to increase. In the event of a wildfire, the elevated amounts of fuel within an unmanaged stand could lead to increased instances of high soil burn severity. Large-scale, severe wildfires can lead to negative impacts to soil such as increased erosion or debris flows, which can threaten soil health, human property, and human life and safety. To clarify, no action would not directly lead to a severe wildfire, but in the chance that a wildfire were to occur, the impacts to soil would likely be more severe and may come with greater consequences.

Proposed Action

The regional soil quality standards recommend maintaining at least 85 percent of an activity area's soil productivity (no more than 15 percent of the area may have detrimental soil disturbance). Of all the harvest units, none would result in detrimental soil disturbance greater than 13 percent.

Units 19B-2, 21A, 23B, 29A-1, 29A-2, 29A-3, 29B-5, 29B-6, 29B-7, 29C, 30A, 30B-1, 30B-2, 31A, 31B, 38C, 39B, and 40B have been identified as having insufficient coarse woody debris according to the requirements listed in the forest plan. Design feature 5 in the Soils section of appendix C requires these units to increase coarse woody debris to trend toward recommended amounts as described in the forest plan (FW-VEG-GDL-03). The proposed action would increase the amount of coarse woody debris in these units for long-term soil productivity and ecological function.

Activity unit boundaries and silvicultural prescriptions were planned such that operations will not occur on mass failure-prone soils. There are also no anticipated negative effects on slope stability because design features would ensure equipment operates in a manner to protect soils.

Cumulative Effects

Detrimental soil conditions caused by harvest, fuels reduction, and road work, in combination with existing detrimental soil conditions caused by past activities, would not result in exceeding regional soil quality standards. Out of all the units, about half would result in 13 to 15 percent detrimental soil conditions and the rest would have 5 percent detrimental conditions or less. No reasonably foreseeable actions overlap with Brebner Flat units and ongoing recreational activities that may occur in the project areas such as hunting, firewood cutting, or hiking would not be impactive enough to cause serious detrimental soil conditions.

Effects to Rare Plants

Summary

The proposed project would have no effects to endangered or threatened plant species. No endangered species or their habitat are listed for the project area within Shoshone County. Fifteen sensitive species are associated with the moist forest habitat present in the project area. The proposed project may impact undetected individual plants or suitable moist forest habitat, but would not likely contribute to a trend towards Federal listing or cause loss of viability to the population or species. A single sensitive plant occurrence is documented within the project area, but is more than 100 feet from proposed treatment activities and would not be affected.

Analysis

In accordance with the 2015 forest plan guideline FW-GDL-VEG-07 and desired condition FW- DC-VEG-09, this analysis evaluated the proposed project area for the presence of threatened, endangered, and sensitive plant occurrences and associated habitat, and examined the potential impacts of the proposed action to any such plants occurring or likely to occur within the project area, as well as to habitat suitable for these species.

The spatial boundary for analyzing environmental effects of the proposed action is the project area boundary, as the direct and indirect impacts of proposed activities would interact with those of the past, present, and reasonably foreseeable future actions within this area. The temporal boundaries for short-term cumulative effects range from time of implementation to 5 to 8 years, depending on the implementation schedule for the actions. After this time, most short-term effects diminish. Long-term effects may still be apparent 10 or more years following implementation.

Effects from proposed activities may still be apparent after 50 years, but predicting effects to botanical resources beyond this time is unreliable.

Several types of high quality sensitive plant habitat are present in the project area: wet, moist, and dry forest and subalpine habitat. Each type provides conditions suitable for certain groups, or guilds, of sensitive species (see Brebner Flat Botany report for a discussion of habitat guilds and the distribution of habitat types within the project area). The proposed activity areas encompass 760 acres of moist forest habitat (no other habitat type); therefore, this analysis focused exclusively on possible effects to the moist forest sensitive species guild. A single sensitive plant occurrence (Mingan moonwort) was documented in the project area, along with four occurrences of forest species of concern. Forest species of concern are at-risk species for which there is concern at the planning (or national forest) level, but which are considered

secure regionally or globally[7]. They are tracked, but not managed, by the Forest Service. The presence of the sensitive moonwort and forest species of concern indicate that currently, the project area includes habitat conditions favorable for these at-risk species.

No Action

With no action, there would be no direct effects to sensitive plants or habitat. Habitat for certain moist forest sensitive species is maintained by 10- to 30-year intervals of disturbance by wildfire, meaning that continued forest succession may indirectly result in the degradation of conditions suited to them.

For other sensitive species associated with the humid shade of mature stands and micro-site seeps and springs, suitable habitat would continue to develop and be maintained under existing conditions (see Botany Report for further discussion).

At the same time, current levels of insect and disease-induced tree mortality in the proposed treatment units are causing low levels of ongoing mortality that, if left untreated, would mean that some stands would not reach maturity, thus reducing favorable conditions for certain sensitive species. Finally, continued fuel loading under conditions of fire suppression and current forest stand health would increase the risk of a high-intensity wildfire, which, although not predictable, would reduce suitable habitat and cause damage and possibly mortality to existing sensitive plant populations.

Proposed Action

The proposed activities could directly impact undetected individual sensitive plants, which could be inadvertently damaged or killed. For instance, plants could be crushed or trampled by timber removal equipment and personnel and buried by slash or soil. Underburning could scorch plants and soil (the latter adversely affecting mycorrhizal associations and seed banks).

Additionally, the removal of canopy cover and soil disturbance associated with the proposed activities would indirectly alter sensitive plant habitat, changing microclimate conditions like temperature and moisture and disrupting mycorrhizal networks through the removal of host coniferous trees and disturbance of the litter and duff layer. The proposed silvicultural treatments include various types of regeneration harvest, all of which would result in removal of most of the overstory. As a result of consequent increased solar insolation, the 1,719 treated acres would convert back to an early-seral stage of ecological succession, which favors pioneer-type species. Therefore, for the 760 acres of moist forest habitat, proposed silvicultural activities would pose a temporary moderate risk to associated sensitive species, most of which require the shade and humidity associated with mid- to late-seral stages. In the long term, though, the proposed action would increase biological diversity in this area, by improving the chance of development of mature forest stands composed of a greater diversity of desired tree species (consistent with forest plan desired conditions FW-DC-VEG-11) and associated understory species.

As discussed in more detail in the Soils report, ground-based logging causes more soil disturbance and compaction than skyline logging. For this reason, ground-based logging poses a moderate risk and skyline logging a low risk to sensitive plants. Specifically, disruption of soil composition and structure can have negative indirect impacts to sensitive plants, especially for species reliant on belowground networks between plant roots and soil fungi (including 7 of the 15 moist forest sensitive species). The proposed use of skyline harvesting for 86 percent of the treatment acres (1,480 of 1,719), along with the retention of coarse and woody debris (Soils design features), would help minimize soil disturbance and compaction and maintain soil productivity and ecological function (including intact fungal networks), contributing to conditions more favorable for sensitive plants.

The 9.05 total miles of proposed roadwork would also result in vegetation removal and soil disturbance. The limited scale of these activities means that these activities pose an overall low risk to sensitive plants

[7] They are identified based on criteria outlined in Forest Service Manual 1909.12_40, 43.22b and 43.22c

and habitat. Also, 2.96 miles of road reconstruction occurs in existing road prisms, which are generally of low suitability for sensitive plants (with the notable exception of several Moonworts; see Botany report).

Fuel-reduction activities following timber harvest would include underburning, machine-piling, and whole-tree yarding. The latter two activities pose the direct and indirect risks associated with machinery and soil disturbance and compaction already described. Underburning, to some degree, would mimic natural wildfires, the effects of which would benefit sensitive plants and habitat, since most habitats in this region co-evolved with some interval of fire. However, underburning also has the potential to consume dead and decaying wood that (along with conifers) serve as hosts for mycorrhizae important to many of the moist forest sensitive plants. Fire and Fuels design feature 2, designed to protect soil structure and composition, would mitigate this risk.

Taken together, the overall impact of the various proposed activities can be considered adverse and low in the short term and beneficial in the long term and would not contribute to a trend towards Federal listing or cause loss of viability to sensitive populations or species (see table below). The single documented sensitive plant occurrence in the project area is located 150 feet from the northwestern boundary of Unit 29b_5 and 235 feet from National Forest System Road 1235; it is well outside of any activity area, but would be flagged and buffered for added protection and visibility.

Table 11. Summary of effects to rare plants

Indicator	Measure	No Action	Proposed Action
Sensitive plant occurrences	Number of occurrences affected	0	0 (protective design features for single sensitive Moonwort)
Sensitive plant habitats	Acres of sensitive plant habitat affected by soil disturbance or changes to canopy cover	0	Low adverse short-term impacts to 760 acres due to proposed activities; long-term benefits to 760 acres
Sensitive plant responses to the proposed activities	Determination category for sensitive plants	NA	For 15 sensitive species associated with moist forest habitat: May impact individuals or habitat but will not likely contribute to a trend towards Federal listing or cause loss of viability to the population or species

Cumulative Effects

Because all reasonably foreseeable and ongoing activities taking place on National Forest System lands within the project area are planned and analyzed to minimize or avoid effects, they are not likely to contribute cumulative effects to sensitive plant populations. Overall, the proposed activities discussed above would have low impacts to sensitive plants.

Effects to Wildlife

Summary

No federally listed species, sensitive species, or forest species of concern are likely to be affected by this project. Effects to elk security habitat is the primary issue that was analyzed. By closing a motorized trail seasonally and reducing the amount of harvest acres from what was originally proposed, elk security would improve in elk management unit 7-6. Although there may be temporary disturbance to elk during project implementation, the result of this project would be improved conditions for elk with no long-term detrimental effects. Elk are expected to persist both in the project area and across the ranger district.

Analysis

Our analysis of wildlife species potentially affected by the Brebner Flat project activities determined that no federally listed species, sensitive species, or forest species of concern are likely to be affected by this project for the following reasons:

- they do not occur in or near the project activity area,
- they are affected at a level that would not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species, or
- effects have been adequately avoided or mitigated in the design of the project.

The detailed analysis of these species is in the Wildlife report (see project record).

Elk security was the primary issue related to wildlife that was analyzed in detail. Indicators used to measure the effects of the proposed activities on elk security include the availability of hiding cover and the amount of timbered areas greater than 250 acres that are more than one-half mile from a motorized route.

Elk are considered habitat generalists, and their basic requirements include forage, water, and, where they are hunted, hiding cover and secure areas (Leege 1984). Lower elevation winter range with good cover and forage or browse is also important to elk. Availability and distribution of these habitat components on each seasonal range determine the distribution and number of elk that may be supported.

Because elk are a hunted species, they are particularly vulnerable to disturbance when there is increased human access into elk habitat. As a result, motorized access management is viewed as an important tool for managing elk populations in Idaho. The forest plan [8] addresses this issue through the concept of "elk security" roughly based on recommendations from Hillis et al. (1991).

To assist in management of elk hunting, Idaho Department of Fish and Game has established 28 elk management zones throughout the state and within those zones, hunting units are called "elk management units." The Brebner Flat Project is located entirely within elk management unit 7-6, which is the geographic scope for the elk security analysis. The forest plan states that management activities in elk management units should maintain existing levels of elk security and where possible, management activities, in high and medium priority elk management units should improve elk security (FW-GDL-WL-13). Elk management unit 7-6 is identified in the forest plan as a low priority management unit.

No Action

Because no timber harvest would occur with no action, stands that are sapling size and larger would be unaffected. In addition, no additional roads would be constructed and no additional gate closures would occur under this alternative; therefore, current levels of elk security would be maintained. Over time, some stands currently in seedling stage 10 years or younger, could potentially transition to security habitat over time, increasing security in elk management unit 7-6 Elk would continue to use the project area at existing levels.

Proposed Action

Regeneration harvest removes areas of elk security by reducing the amount of generally timbered stands of 250 acres or more. It would also increase the amount of forage habitat available to elk but not directly proportionate to the amount of area treated. Wisdom et al. (1986) found that optimal elk foraging habitat lies within 100 yards of cover areas, so any cleared habitat beyond 100 yards from cover would provide limited forage habitat for elk.

The 1,719 acres of regeneration harvest and associated activities would remove approximately 210 acres

[8] See forest plan desired condition FW-DC-WL-17, objective FW-OBJ-WL-0, and guideline FW-GDL-WL-13.

of elk security habitat from elk management unit 7-6. This is a combination of actual harvest (196 acres) and slight changes (14 acres) due to the reconfiguration of the elk security block after harvest. Current elk security levels in the elk management unit are 2,313 acres (figure 6). The timber harvest activities in the project area would reduce the level of security to 2,103 acres. The reduction in elk security (210 acres) would be due to activities associated with timber harvest such as the construction of roads, tree plantings, gopher control, and fuels treatments in the project area.

To compensate for this loss, the seasonal closure of the OHV portion of road 1956E would increase elk security in the elk management unit by 314 acres, leading to a net gain in security of 94 acres (table 12). In order to ensure the security of gates in elk security areas during the closure period the District has implemented a monitoring plan that consists of; 1) monitoring at least 30 percent of gates in elk security each year, 2) monitor "problem" gates annually (those with some history of breaching), 3) document any damage or breaches and have them prioritized for repair the next year (contract process can take up to a year).

Gates are secure on the District but there are a handful (5-10) of "problem" gates that need to be monitored/repaired annually. These gates will be discussed annually to determine if permanently closing or decommissioning them is an option. In addition, we report heavily damaged gates to Law Enforcement which has led to occasional arrests so there is an awareness from an enforcement perspective and hopefully the public. In conjunction with Law Enforcement the District has four trained Forest Protection Officers (FPOs) which are employees that are given the capacity to ticket people breaking the law such as gate breaching. Except for isolated instances, gates are secure on the District.

Table 12. Effects of project alternatives on elk security in elk management unit 7-6 shown as acres changed

Indicator	Existing (no action)	Proposed Action
Current security in EMU 7-6 (acres)	2,313	2,313
Security lost due to project work (acres)	0	-210
Security gained by proposed road closures (acres)	Not applicable	314
Gain/loss of elk security	0	104
Net elk security (acres)	2,313	2,417

Approximately 4 miles of temporary roads are proposed to be constructed. Temporary roads would be decommissioned after use so there would be no motorized vehicle use on these roads after the project. The roads, like the harvest units, would not return to security habitat for at least 10 years. Security habitat develops when the trees reach sapling size or shrubs such as alder reach sapling height. The construction of the temporary roads would remove secure areas, but unlike permanent roads, the roads would be constructed within the harvest units and would not decrease elk security levels beyond that analyzed under timber harvest activities.

Cumulative Effects of the Proposed Action

There are no current timber sales within the Brebner Flat project area but there are foreseeable private land timber harvest activities in the project area that would occur. In our elk security calculations, all private lands are considered "not secure;" therefore, any additional harvest in those areas would not change (decrease) the amount of elk security since we already accounted for the lack of security habitat. There are no other activities ongoing or planned in the project area that would add cumulatively and substantially to the proposed action.

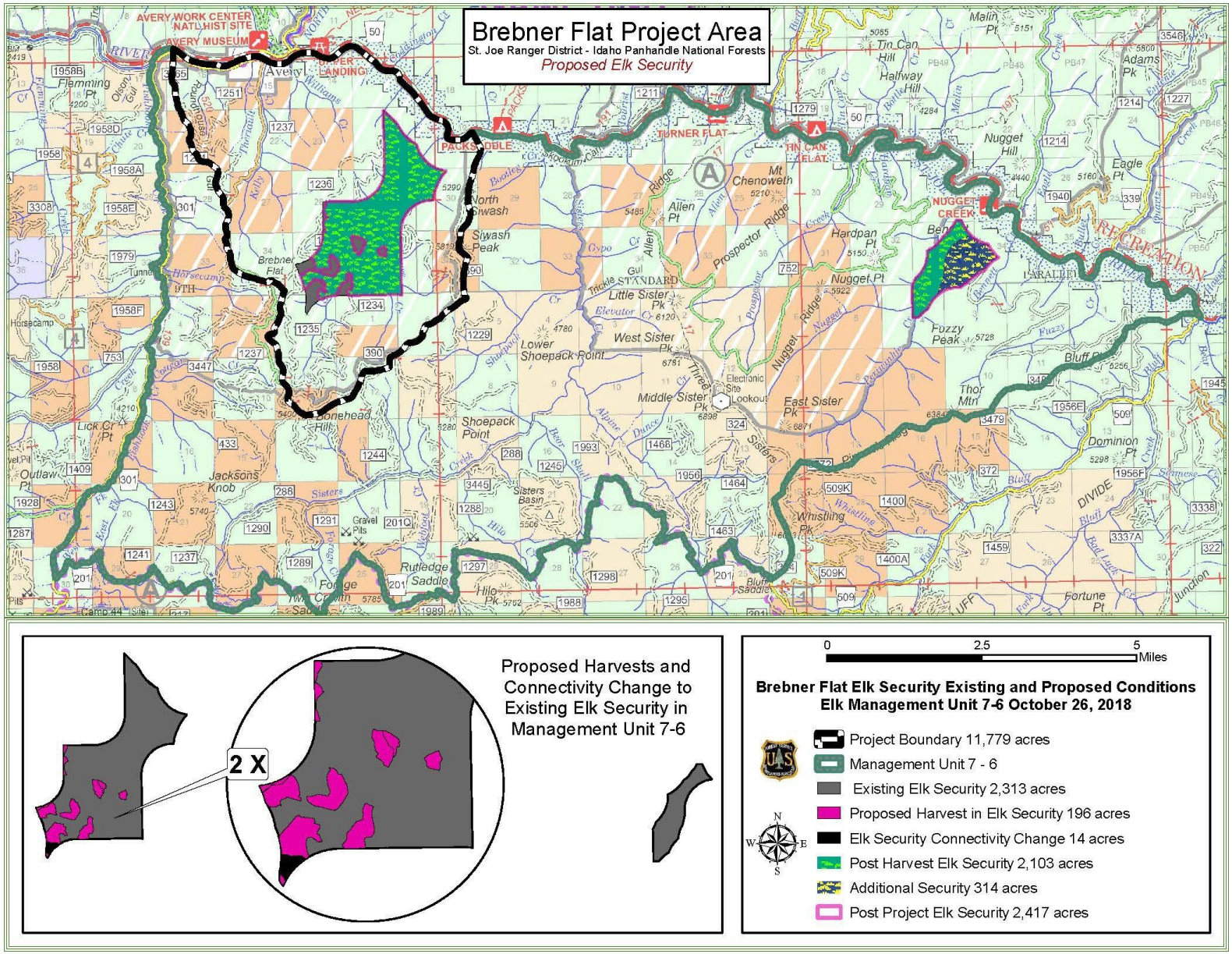

Figure 6. Map of elk management unit 7-6 in relation to proposed harvest units and their effect on elk security

Effects to Scenery Resources

Summary

Under the no-action alternative, current trends would likely continue. Barring a stand-replacing event, slight textural changes would occur in middleground and background views as landscape views are reduced in the foreground. Stark line, color, and form contrasts would remain evident.

Effects of the proposed action would be visible from the surrounding area, and would create form, color, and texture contrasts in the existing landscape. Design features implemented to address the effects of harvest and road activities would soften existing patterns created by past harvest, result in a natural appearance, and begin to move scenic conditions toward forest plan desired conditions for scenic resources to "reflect healthy and sustainable ecosystem conditions" (2015 forest plan, p. 34).

Analysis

Effects of the Brebner Flat Project as viewed from the forest plan-identified concern level 1, 2, and 3 viewing platforms is a potential concern for scenic resources. Scenic integrity is used to measure impacts to scenery. Scenic integrity is measured by the degree to which the landscape appears to be intact, reflecting the inherent landscape character of the surrounding area. The analysis of the direct and indirect effects is based on how the proposed activities are expected to affect the scenic integrity of the landscape in the Brebner Flat project area and meet forest plan scenic integrity guidelines.

The forest plan guideline relevant to the project would be to meet the scenic integrity objectives from concern level 1, 2, and 3 viewing platforms adopted during the forest planning process. The concern level 1 viewing platforms germane to this analysis include St. Joe River, Forest Highway 50, the Town of Avery, Idaho, Upper Landing Picnic Site, Nelson Ridge National Recreation Trail, Cedar Mountain Trail, and Dunn Peak Lookout. Dunn Peak Road is the only concern level 2 viewing platform relevant to the project. The primary scenic integrity objective for the project is "moderate," with smaller areas of "low." The scenic integrity objective of "high" is found in the northern portion of the project area within approximately one-half mile of the St. Joe River.

No Action

With no action, the existing condition would prevail and current trends may continue, barring a stand-replacing fire or disease incident. The slow change resulting from the conversion of the few white pine-, larch-, lodgepole-, and ponderosa pine-dominated stands to the grand fir forest types would increase the areas that are dominated by the finely textured forest cover, which would be evident in middleground and background viewing distances. The grand fir mix stands would continue to exhibit this finely textured forest cover, with a slow but perceptible change as the remaining western white pine, larch, and ponderosa pine are lost. In the foreground viewing distance from the surrounding areas, views would more consistently be of medium-size class as larger trees are killed, with a dense understory of shade-tolerant species that would increasingly reduce views into the stands.

This situation would result in a "homogenized and simplified" landscape (see Silviculture Report), from a visual standpoint, as contrast and interest associated with color and texture are reduced in all viewing distances. To many forest visitors, the visual appearance of such a landscape has aesthetic appeal. However, it does not move the project area toward the forestwide desired condition for scenic resources that reflect healthy and sustainable ecosystem conditions" (2015 forest plan, p. 34).

Proposed Action

Effects of harvest operations and road activities have the potential to affect scenic resources. Harvest activities proposed for this project would be visible from several locations, including the concern level 1 and 2 viewing

platforms (listed above). Effects of vegetation management treatments would range from created openings with few remaining trees where the ground would be visible to where the remaining trees would partially obscure the ground below. It is expected that 5 to 10 trees per acre would be retained in the clearcut with reserves units and as many as 30 trees per acre in the irregular shelterwood with reserves treatment units.

Various types of logging systems would be used based on terrain and access constraints. On steeper terrain, skyline and off-road skyline yarding systems would be used, and tractor yarding would be used on flatter ground. In skyline units, reserve trees would be greater in number and denser at the lower elevations of the unit compared to the higher elevations. In tractor units, it is expected that reserve trees would be dispersed more uniformly throughout the unit.

Related to effects of treatment are the effects associated with harvest and construction operations, which are generally perceived negatively by the public. Activities would include equipment operation, road construction, road reconstruction, temporary road construction, landing construction and use, skid trail construction and use, and slash piling and disposal. The effects of these activities would include ground disturbance, stumps, generation of slash, and damaged reserve trees.

Effects of operations would be most noticeable during the first several years following treatment. In the short term, soil disturbance related to operations would be visible depending on location and screening by remaining vegetation. In the long term, it is expected that many of the impacts associated with project operations would have dissipated, as seen in all viewing distances.

Groundcover of grasses and some shrubs would begin to recover and regeneration of trees would be evident, together screening some stumps and downed woody debris left in the unit. Effects of slash piling and disposal would have also dissipated.

The effects of proposed activities would be most visible from sites, trails, and roads located north of the project area, across the St. Joe River. Only portions of two units (01b and 03b) would be visible from the road 50, and these effects would be limited by the short duration of the view, the steep viewing angle, and by application of project design features that would retain additional trees to screen views of the new opening.

Many of the units proposed in the north portion of the project area would be visible from the Nelson Ridge National Recreation Trail, Cedar Mountain Trail, Dunn Peak Lookout, and Dunn Peak Road. These include units 01b, 03a, 03b, 06a, 06b, 08a, 08b_1, 08b_2, 09a, 09b, 11a, 11b, 12b, 13a, 13b_1, 13b_2, 13c, 14b, 19b_1, 19c and 23a. The treatments proposed for these units would result in new created openings, resulting in color and texture contrasts with the surrounding areas. To minimize these impacts, project design features would provide for all units to be shaped to resemble natural openings in the surrounding area, avoiding straight lines and right angles in design and layout. In addition, for the units identified above, project design features would require feathering of unit boundaries to help blend these units into the surrounding area. For the larger units, project design features would require the retention of leave trees within the harvest area intended to break up the larger openings.

New permanent road construction proposed to access units 03a, 03b, 09a, 09b, 13a, 13b_1, 13b_2, and 13c would also be visible from these viewing platforms, and would result in introduced line and color contrasts that have the potential to dominate in the middleground viewing distance. Project design features would be required to retain vegetation adjacent to the road to screen the effects of these roads.

Effects of treatment in unit 14 would be most evident due to its location on the upper portion of an approximately 50 percent slope. Treatment would create an opening with some trees remaining, resulting in color and texture contrasts. In addition, treatment in this unit would expose the existing road at the top of the unit, lending it a geometric appearance and resulting in line contrasts. To minimize these contrasts, adequate trees would be retained along the top of the unit to minimize the visibility of the road and to reduce the visual impact of this unit. As with other units described above, layout of this unit would avoid straight boundaries on

the sides and bottom of the unit, and include feathering of these sides and bottom edges adequate to avoid creating a "bole edge" effect.

The effects of the proposed action with the associated scenery design features would meet forest plan scenic integrity objectives in the short term and long term, depending on viewing platform and viewing distance. Table 13 and table 14 describe how the effects of harvest treatments and new road construction will meet the applicable scenic integrity objective.

Table 13. Scenic integrity objective by harvest unit number

Harvest Unit Number	Scenic Integrity Objective	Does Proposed Action Meet Scenic Integrity Objective in Long Term?
01	High	Yes, with design features applied
13a, 13c	High/Moderate	Yes, with design features applied
02b, 03a, 03b, 05b, 06a, 06b, 08a, 08b_1, 08b_2, 09a, 11a, 11b, 12b, 13b_1, 14b, 19b_3, 19c, 20a, 20b_1, 20b_2, 21a, 21b, 26a, 27a, 28a, 29a_2, 29b_5, 29c, 31a, 31b, 32a, 33a, 34b, 35a, 36a	Moderate	Yes, with design features applied
09b, 19b_2, 22a, 22b, 23a, 23b, 27b, 28b, 29a_1, 29a_3, 29b_6, 29b_7, 30a, 30b_1, 30b_2, 34a 37b_2, 37b_3, 38c, 39a, 39b, 40b, 41b	Moderate/Low	Yes, with design features applied

Table 14. Scenic integrity objective in relation to new road construction

New Road Construction (Number)	Scenic Integrity Objective	Does Proposed Action Meet Scenic Integrity Objective in Long Term?
NC-01	Moderate	Yes, with design features applied
NC-04	High/Moderate	Yes, with design features applied
NC-08	Moderate	Yes, with design features applied
NC-10	Moderate	Yes, with design features applied

Cumulative Effects of the Proposed Action

Effects of past and present actions such as road construction, timber harvest, and fire suppression have the potential to affect scenic resources. Past timber harvest, employing a variety of prescriptions and logging systems, has occurred throughout the surrounding area on National Forest and private lands. Results of these actions are visible in varying degrees from concern level 1 and 2 viewing platforms examined in this analysis. Due in large measure to viewing distance (primarily middleground and background), effects from these actions range from an altered appearance, where contrasts are minimal, to a modified appearance that dominates the view shed, depending on soils, aspect, vegetative species composition, and state of regeneration, as well as viewing distance.

The effects of these past timber harvest activities are noticeable to the average viewer and may dominate the viewshed in the foreground and middleground, but are generally subordinate to the landscape character being viewed in the distant middleground and background viewing distances. The effects of road construction are visible in all viewing distances, and can dominate the view shed.

Reasonably foreseeable future activities that have the potential for effects to scenic resources include fire suppression, precommercial thinning, white pine pruning, road maintenance, outfitter and guide operations, herbicide spraying, dam operations on Kelly Creek, and public firewood gathering and recreational use (including off-highway vehicle use). Effects from these activities would be similar to those described above.

The combined effects of the proposed action and the effects of past, present, and reasonably foreseeable future actions described above would be noticeable, but would not lower the scenic integrity levels of the area when design features are applied. In some areas, where the geometric shapes and lines of harvest on private land are visible and even dominate the viewshed, the effects of the proposed action would soften these edges, making them less obvious from the identified viewing platforms.

Forest Plan Consistency

The effects of the proposed actions would meet the forest plan scenic integrity objectives in the short term and long term. Effects of harvest activities in unit 01b will meet the scenic integrity objective of high as seen from Forest Highway 50 and the St. Joe River with the prescribed project design features applied. Effects of the proposed timber harvest activities would meet a scenic integrity level (or scenic integrity objective, as appropriate) of low in the short term, and the scenic integrity objective of moderate in the long term as seen from the Nelson Ridge National Recreation Trail, Cedar Mountain Trail, Dunn Peak Lookout, and Dunn Peak Road with the prescribed project design features applied.

Effects of the proposed road system management activities would meet a scenic integrity level rating of low in the short term, and the scenic integrity objective of moderate in the long term as seen from the Nelson Ridge National Recreation Trail, Cedar Mountain Trail, Dunn Peak Lookout, and Dunn Peak Road with the prescribed project design features applied.

Effects to Recreation

Summary

Implementation of the proposed action would result in 1.07 miles of a motorized trail in Elk Management Unit 7-6 becoming seasonally restricted and closed between September 3 and December 21st to motorized access.

Treatment activities would result in short-term displacement of recreation opportunities within the project area, but not result in long-term displacement.

Analysis

This analysis considers potential effects of the project to routes available for year-round motorized recreation and general recreation opportunities. There are approximately 57 miles available for summer off-highway vehicle motorized recreation within the analysis area. There are 8 miles of groomed snow routes within the project area. The dispersed recreation opportunities range from roaded and motorized to nonmotorized areas, providing opportunities for dispersed camping, hunting, berry picking and off-highway vehicle riding.

No Action

With no action, no changes are expected to occur to the summer or winter motorized recreation opportunities or dispersed recreation opportunities.

Proposed Action

The routes available for use by summer motorized recreation would be negligibly decreased by a permanent seasonal restriction to 1.07 miles of off-highway vehicle routes, approximately a 1 percent seasonal decrease within the analysis area. Approximately 4.08 miles of off-highway vehicle routes would be temporarily inaccessible for up to 5 years during the implementation of the proposed action. Routes used for harvest activities may receive some clearing and surface maintenance resulting in improved conditions for motorized recreation.

Cumulative Effects of the Proposed Action

Present and past activities such as road decommissioning, road storage, seasonal restrictions, timber harvest, fire suppression, timber stand improvements, as well as public recreational activities have shaped the current

layout and mileage of routes available for off-highway vehicle and groomed snow routes. Within the analysis area, these actions in combination with the proposed action on National Forest System land and adjacent property would result in negligible change to off-highway vehicle route access and may result in short-term (less than 5 years) impacts to groomed snow routes accessible directly from the community of Avery, Idaho (see table 15).

Present and past activities such as road decommissioning, road storage, seasonal restrictions, timber harvest, fire suppression, timber stand improvements, as well as public recreational activities have shaped the current availability of dispersed recreational opportunities within the analysis area. Similar future actions taken on National Forest System land and adjacent properties would not result in long-term impacts to dispersed recreation opportunities because long-term effects (beyond 5 years) from the project are negligible.

Table 15. Summary of resource indicators and measure for recreation by alternative

Resource Element	Resource Indicator	Measure	Existing Condition	No Action Magnitude of Change	Proposed Action Magnitude of Change
Routes Available for Motorized Recreation Opportunities	Safe motorized recreation opportunities available	Miles	Year Long 53.24 Seasonal Restriction 3.8 Total 57.04	0 for all	Year Long -2% Seasonal Restriction +28% Total 0
Routes Available for Motorized Recreation Opportunities (over-snow)	Groomed over-snow motorized recreation opportunities available	Miles	91	0	0
Dispersed Recreation Opportunities	Year round outdoor recreation opportunities and experiences available	Acres	Rural 126 Roaded Natural 9,209 Semi Primitive Motorized 4,025 Semi Primitive Non-Motorized 21,829	0 for all	0 for all

Effects to Fisheries

Summary

The proposed project may affect but is not likely to adversely affect federally listed bull trout due to the potential for sediment generated in Kelley and Williams Creeks to reach the St. Joe River. The proposed project may impact westslope cutthroat trout individuals or habitat present in Kelley Creek, but will not likely contribute to a trend toward federal listing. Westslope cutthroat trout using other streams of the analysis area would not be affected by implementation of the proposed action. The proposed project would not affect connected spawning and rearing habitat because there would be no new roads crossing any fish-bearing streams. The amount of unconnected habitat on Kelley Creek would remain the same due to the barrier on private lands. The implementation of this alternative contributes to the forest plan goal AQH-01 “for restoring aquatic habitat where past management activities have affected stream channel morphology” due to the lack of negative impacts to Siwash and Blue Grouse Creeks. The proposed action has the potential to slow natural process recovery of Kelley Creek. Project file document F-22 provides detailed analysis and F-23 provides documentation of compliance with the forest plan.

Analysis

This analysis looks at how the existing condition could be affected by the proposed action as compared to no action. Fish habitat requirements include a variety of elements that combine to make quality fish habitat (USFWS 1998). The forest plan describes the conditions of the habitat elements that would meet the desired condition for aquatic habitat. Existing conditions are described by how closely the existing characteristics meet the desired conditions. The analysis describes how the proposed actions (timber harvest, road construction, road storage and decommissioning, and fuel treatment), when imposed on the existing conditions, would affect the habitat elements (resource indicators). This analysis specifically considers the following resource indicators and measures:

- connectivity of fish habitat;
- trend for the quality of aquatic habitat; and
- trend for specific aquatic species populations.

No Action

There would be no direct, indirect, or cumulative effects from the selection of this alternative because no activities are proposed.

Proposed Action

Timber Harvest

Timber harvest would not create any barriers to the movements of aquatic species as there would be no reduction in connected spawning and rearing habitat. There would be no direct effects from timber harvest because Inland Native Fish Strategy buffers would be used for all harvest units adjacent to streams. Best management practices monitoring of past buffers on units has shown that these buffers protect instream conditions from timber harvest (Cristan et al 2016, NCASI 2012, Seyedbagheri 1996).

Based on the watershed analysis of effects to stream channel stability, timber harvest may indirectly affect the instream habitat used by aquatic species. The hydrology analysis determined that Kelley Creek could experience peak flow increases, due to the proposed timber harvest, which could cause an increase in frequency of bankfull events. This increase in bankfull events could increase the input of sediment to the channel, which could increase sediment filling pool habitat in Kelley Creek.

Timber harvest would have no direct or indirect effect on the trend of the bull trout population because timber harvest effects that may occur in the fish-bearing streams of the project are not occupied by bull trout. Timber harvest activity could have a negative effect on westslope cutthroat trout because of the potential for negative changes to stream channel conditions due to increases in peak flows that are identified in the hydrology analysis.

Road Construction

Road construction would have no direct effects to aquatic species indicators because the road construction projects do not cross fish-bearing streams or flowing water. However, road construction projects do have the potential to create indirect effects to aquatic species habitat from potential sediment inputs into the streams. Detailed discussion of indirect effects from this activity are analyzed in the hydrology report. The conclusions from that report are considered in the determination for the trend of aquatic species habitat.

The road construction associated with the implementation of this alternative would not impact the amount of connected habitat because none of the proposed roads cross a fish-bearing stream.

Road construction would increase road densities from 3.1 to 3.5 miles per square mile. This is an increase but it would still maintain the road density at a moderate level as rated in the forest plan, appendix D. The roads are

located high on the slope which reduces their influence on the stream channels. Foltz (2008) concluded that sediment returned to background levels at a distance of 810 meters from a culvert removal. The new road construction ranges from 229 to 1630 meters up slope of fish bearing streams and only two of these roads is less than 810 meters distance. The new road construction ranges from 559 to 7485 meters away for the St. Joe River with only one road less than 810 meters distance. (PF doc F_30). The potential for sediment to reach fish bearing streams is also reduced due to woody debris in the channels trapping sediment (PF docs: F-06, F-07, F-08, F-09, and F-11). This activity would have no effect on the trend of the bull trout population because the road construction would occur in Kelley, Siwash and Blue Grouse Creeks, none of which are occupied by bull trout. The St. Joe River, which is used by bull trout, would not be affected because potential sediment generated by road construction would mainly be trapped in riparian vegetation or instream areas of Kelley and Siwash before reaching the St. Joe.

This activity would have no effect on the trend of the westslope cutthroat trout population because the new road construction would occur in upslope areas of Kelley, Siwash and Blue Grouse Creek drainages, and would not cross fish-bearing streams. Sediment generated from this construction would be trapped prior to reaching a fish-bearing reaches of Kelley, Siwash or Blue Grouse Creeks or the St. Joe River.

Road Storage and Decommissioning

Road storage and decommissioning would have no effect to habitat connectivity because none of the roads being treated crosses a fish-bearing stream. The road storage and decommissioning projects could create indirect effects to aquatic species habitat through the generation of sediment. There would be approximately 15 culverts removed on non-fish-bearing streams, which could create short-term pulses of sediment during the removal. In the long term, this would be beneficial because there would be a reduction in risk of culvert failure, which could cause large inputs of sediment to the channel.

This activity would have no effect on the trend of the bull trout population because the road storage and decommissioning would occur in Siwash and Blue Grouse Creeks, which are not occupied by bull trout. This activity would have a static trend for the quality of the habitats used by westslope cutthroat trout in Siwash and Blue Grouse Creeks; therefore, the project would maintain a status quo condition for the westslope cutthroat trout population in those streams.

Road Reconstruction

Road 1234 would be reconstructed. This road is currently in long-term storage with culverts removed. This activity would have no direct effects to the aquatic species indicators because the roads being reconstructed are not crossing fish-bearing streams. Detailed effects analysis regarding indirect effects from this activity are discussed in the hydrology report and considered as an indirect effect to aquatic species habitat.

There would be 2.96 miles of road reconstructed but none is crossing fish-bearing streams in the project area. There would be a short-term increase in sediment as the culverts are replaced on these roads. There would be a long-term risk for increased sediment generation to the stream due to the retention of culverts on a gated road. The risk of increased sediment leads to a greater risk of negative effects to aquatic species habitat.

This activity would have no effect on the trend of the bull trout population because the road reconstruction would occur in Siwash and Blue Grouse Creeks, which are not occupied by bull trout.

This activity would have a static trend for the quality of the habitats used by westslope cutthroat trout in Siwash and Blue Grouse Creeks; therefore, the project would maintain a status quo condition for the westslope cutthroat trout population in those streams.

Road Maintenance

Road maintenance would be conducted on all existing roads, which would be used for the timber sale. Road maintenance activities were analyzed and consulted on in the Idaho Panhandle Forests Road Maintenance Program Biological Assessment, 2004. A letter of concurrence for that activity was received in 2004. All

descriptions of actions, design features, and species-specific mitigation measures described in the biological assessment would be adhered to for road maintenance within the Brebner Flat Project area.

Cumulative Effects of the Proposed Action

Kelley Creek

The implementation of the proposed action would not change the amount of connected habitat within Kelley Creek because of the lack of road crossings on fish-bearing streams. The stream would continue to have reduced connectivity because of the barrier on privately managed lands.

Private industrial timber land comprises approximately 38 percent of the Kelley Creek drainage. This land has been harvested in the recent past and plans exist to continue harvesting in a similar manner as what occurred in the past. Harvest on private lands must adhere to Idaho State Best Management Practices regarding stream protection buffers and road construction and maintenance.

The hydrology report states that the addition of harvest units to a drainage that has had recent harvest over the majority of the private lands could cause an increase in peak flows, which could result in streambed scour, aggradation and bank erosion. These types of effects to the stream channel would have a negative effect on habitats used by fish (for example, pool habitat could become shallower). The effects from the proposed timber harvest, the recent timber harvest on private lands and the proximity of National Forest System road 1237 within the riparian habitat conservation area could combine to have the potential for negative effects to pool frequency and pool quality. Pool frequency is a criterion in the forest plan identified as a feature of desirable stream habitat condition.

The implementation of the proposed action would not affect the trend for bull trout populations because bull trout do not use Kelley Creek. However, the potential for a reduction in instream habitat quality has the potential to have an effect on individual westslope cutthroat trout in Kelley Creek. The potential reduction in stream habitat in combination with the migration barrier on private lands near the mouth of Kelley Creek has the potential for affecting individual westslope cutthroat trout. Kelley Creek is a small stream; therefore, it would never supply a large percent of the westslope cutthroat trout in the St. Joe River drainage. This project may impact individual westslope cutthroat trout or habitat, but will not likely contribute to a trend toward federal listing.

Siwash Creek

There are no barriers on Siwash Creek, and there would be no change to this habitat connectivity following implementation of this project. The implementation of the proposed action would maintain or may slightly degrade the quality of aquatic habitat within Siwash Creek.

Private industrial timber land comprises approximately 15 percent of the Siwash Creek drainage. This land has been harvested in the recent past and plans exist to continue harvesting in a similar manner as what occurred in the past. The hydrology report states that the addition of harvest units to this drainage would not alter the condition of the stream channel and thus there would be no change to the quality of aquatic habitat.

The implementation of the proposed action would not affect the trend for bull trout populations because bull trout do not use Siwash Creek. The implementation of this alternative would not alter the status of the population of westslope cutthroat trout in the Siwash Creek drainage.

Siwash Creek is a small stream therefore would never supply a large percent of the westslope cutthroat trout in the St. Joe River drainage. Therefore, the proposed project would have no impact to the westslope cutthroat trout population.

Blue Grouse Creek

There are no barriers on Blue Grouse Creek, and there would be no change to this status connectivity following

implementation of this project. The implementation of the proposed action would maintain or slightly degrade the quality of aquatic habitat within Blue Grouse Creek.

Private industrial timber land comprises approximately 26 percent of the Blue Grouse Creek drainage. This land has been harvested in the recent past and plans exist to continue harvesting in a similar manner as what occurred in the past. Harvest on private lands must adhere to Idaho State Best Management Practices regarding stream protection buffers and road construction and maintenance.

The hydrology report states that the addition of harvest units to this drainage would not alter the condition of the stream channel and thus there would be no change to the quality of aquatic habitat. The implementation of the proposed action would not affect the trend for bull trout populations because bull trout do not use Blue Grouse Creek. The implementation of the proposed action would not alter the status of the population of westslope cutthroat trout in the Blue Grouse Creek drainage. Blue Grouse Creek is a small stream therefore would never supply a large percent of the westslope cutthroat trout in the St. Joe River drainage. Therefore, this project would have no impact to the westslope cutthroat trout population.

St. Joe River (at the confluence with Fishhook Creek)

There are no barriers on the St. Joe River, and there would be no change to habitat connectivity following implementation of this project. The implementation of the proposed action would maintain the current upward trend of aquatic habitat quality in the St. Joe River; however, there is a potential for increased sediment entering the St. Joe from the fish bearing streams (Siwash Creek and Kelley Creek) and the non-fish bearing streams (Theriault and Williams Creeks). These systems are very small compared to the St. Joe River and therefore would have a minimal effect.

The implementation of the proposed action would not affect the trend for bull trout populations; however, because of the potential for an increase in sediment entering the St. Joe from the project area, the determination for individual bull trout is the proposed action may effect but is not likely to adversely affect bull trout-.

The implementation of the proposed action would not affect the trend for westslope cutthroat trout populations; however, because of the potential for an increase in sediment entering the St. Joe from the project area the determination for the species is the project may impact individuals or habitat, but will not likely contribute to a trend toward federal listing.

Effects to Heritage

Summary

The proposed project is located in a low heritage site density area. There have been six heritage surveys conducted within the Brebner Flat Project area. Nine heritage sites are located within the project area and all are historic in nature. Eight of the sites are recommended as not eligible for the National Register of Historic Places and one is unevaluated. A consultation for section 106 of the National Historic Preservation Act was completed with the State Historic Preservation Office. The Office concurred with the finding of no effect to historic properties.

Analysis

The heritage survey for the project was conducted in the spring and summer of 2014 and 2015. The inventory results for the Brebner Flat Project located two new historic resources (historic trail segments), within the project boundary. The trail segments are recommended not eligible for the National Register of Historic Places.

Proposed Action

No eligible historic properties have been identified within the proposed harvest units; therefore, the project will

result in no historic properties affected. Protection measures per the Programmatic Agreement with the Idaho State Historic Preservation Officer and the Site Inventory Strategy would protect heritage resources from potential impacts.

Cumulative Effects of the Proposed Action

Cumulative effects are analyzed at the resource level. Because there are not expected to be any adverse effects to historic properties as a result of the Brebner Flat Project, there would not be any cumulative effects to heritage resources.

Agencies and Persons Consulted

The Forest Service mailed scoping letters describing our proposed action and comment period to 46 individuals on our mailing list. The notice of a public comment period was posted on the Idaho Panhandle National Forest website. Notices of the public comment period and open house meeting also appeared in the Coeur d Alene Press and Saint Maries Gazette. In addition, the Forest Service consulted the following individuals, Federal, State, tribal, and local agencies during the development of this environmental assessment.

- Benewah County Commissioners
- Benewah County Natural Resource Team
- Shoshone-Benewah Collaborative Group
- Coeur d'Alene Tribe
- Idaho Department of Parks and Recreation
- Idaho Department of Fish and Game
- Idaho State Historical Preservation Office
- Shoshone County Commissioners
- U.S. Fish and Wildlife Service
- Idaho Department of Environmental Quality

Appendix A – Maps

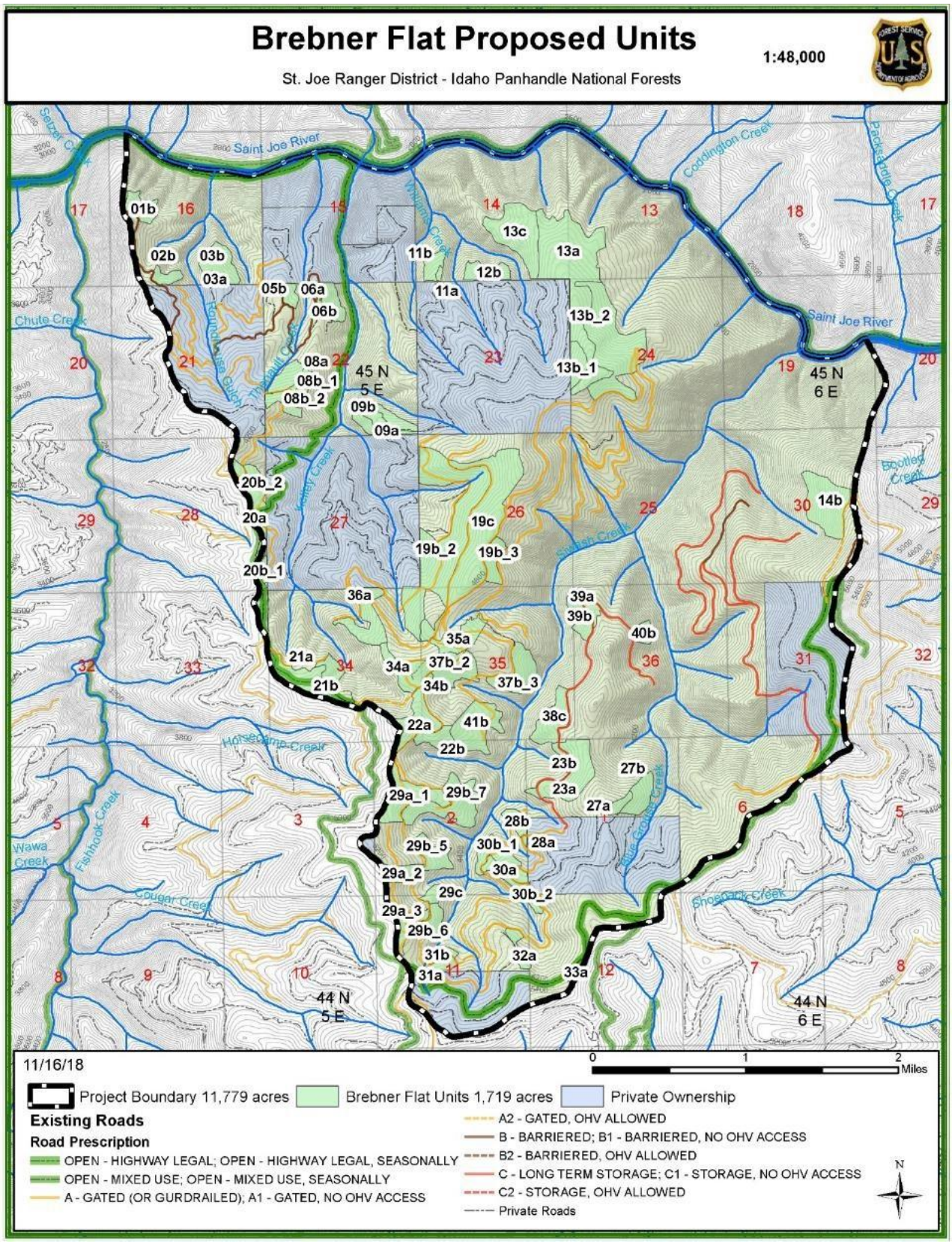

Figure 7. Location of proposed treatment units and existing roads

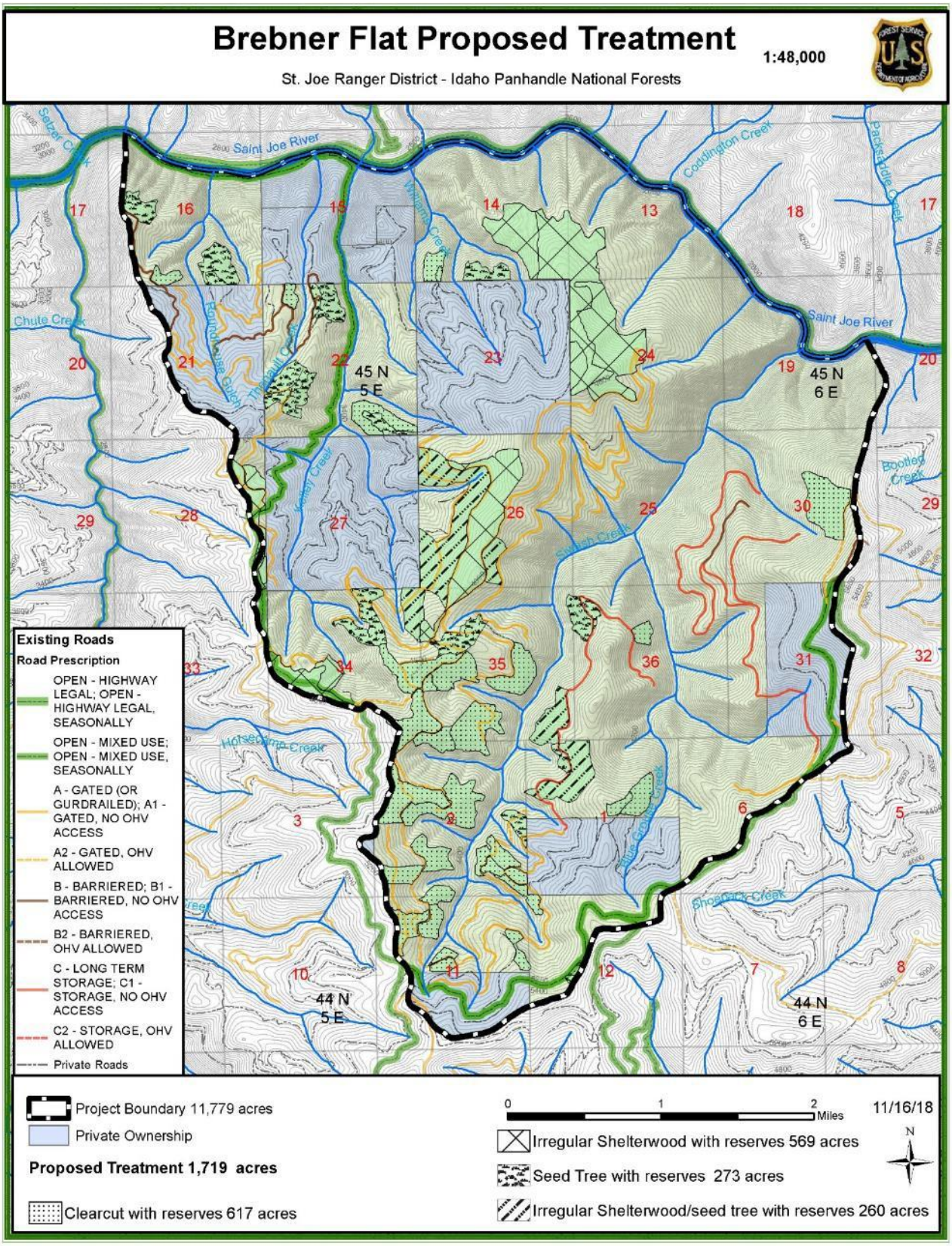

Figure 8. Proposed harvest treatments and existing roads

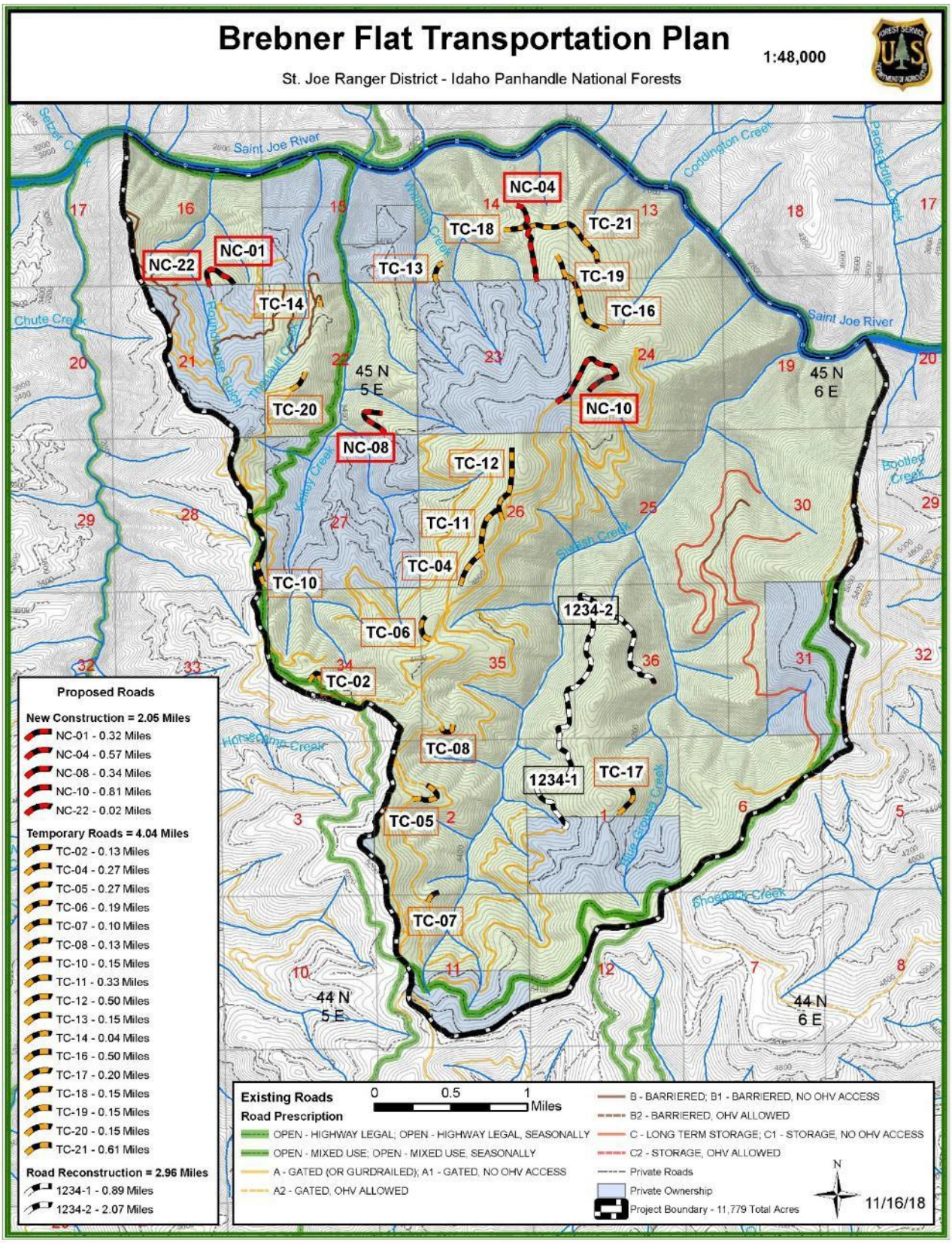

Figure 9. Proposed new roads, temporary roads, and road reconstruction

Appendix B – Road Treatment Tables

Table 16. New road construction

New construction	Mile Post to Mile Post	Total
NC-01	0.0 – 0.3	0.32
NC-04	0.0 – 0.6	0.57
NC-08	0.0 – 0.3	0.34
NC-10	0.0 – 0.8	0.81
Total New construction miles	N/A	**2.04**

Table 17. System roads to be added

Existing Road Prescription	Proposed Road Prescription	Road Number	Mile Post to Mile Post	Proposed Action Miles
Closed Nonsystem Road	Add to System and Store	390UD	0.0 – 0.73	0.73
Closed Nonsystem Road	Add to System and Close w/Gate	3468UB	0.0 – 0.29	0.29
Closed Nonsystem Road	Add to System and Close w/Gate	1236UB	0.0 – 0.34	0.34
Total Road Miles added to NF System	N/A	N/A	N/A	**1.36**

Table 18. System road reconstruction

System Road Number	Mile Post to Mile Post	Total
1234-1	0.0 – 0.9	0.89
1234-2	0.0 – 2.07	2.07
Total Reconstruction miles	N/A	**2.96**

Table 19. Temporary roads

Temporary Road Number	Length (Miles)
TC-02	0.13
TC-04	0.27
TC-05	0.27
TC-06	0.9
TC-07	0.10
TC-08	0.13
TC-10	0.15
TC-11	0.33
TC-12	0.50
TC-13	0.15
TC-14	0.04
TC-16	0.50
TC-17	0.20
TC-18	0.15
TC-19	0.15
TC-20	0.15
TC-21	0.61
Total miles	**4.04**

Table 20. System roads to be maintained

System Road Number	Mile Post to Mile Post	Total
1234	0.0 –2.9	2.90
1235	0.0 –5.12	5.12
1236	0.0 –7.21	7.21
1237	0.0 –7.1	7.10
1239	0.0 –.46	0.46
1248	0.0 –1.83	1.83
1249	0.0 –0.66	0.66
1250	0.0 –0.69	0.69
1251	0.0 –4.63	4.63
1251A	0.0 –0.17	0.17
1433	0.0 –0.8	0.80
1433A	0.0 –0.05	0.05
3465	0.0 –1.08	1.08
3485	0.0 –0.75	0.75
3468	0.0 –1.44	1.44
3467	0.0 –0.16	0.16
3464	0.0 –0.37	0.37
3656	0.0 –0.48	0.48
3657	0.0 –0.54	0.54
3659	0.0 –3.18	3.18
3659A	0.0 –0.56	0.56
3620	0.0 –1.65	1.65
3437	0.0 –0.3	0.30
390	0.0 -5.59	5.59
Total Road Maintenance (Miles)*	N/A	**36.44**

* Total number of roads maintained includes segments of Road 390 outside the project boundary.

Table 21. Closed road prescriptions

Existing Road Prescription	Proposed Road Prescription	Road Number	Mile Post to Mile Post	Proposed Action Miles
Stored	Reconstruct & Store	1234-1	0.0 - 0.9	0.9
Stored	Reconstruct & Store	1234-2	0.0 – 2.07	2.07
Closed w/Gate	Closed w/Gate	1234	0.0 –2.9	2.90
Closed w/Gate	Closed w/Gate	1235	0.0 –5.12	5.12
Closed w/Gate	Closed w/Gate	1236	0.0 –7.21	7.21
Closed w/Gate	Closed w/Gate	1239	0.0 –.46	0.46
Closed w/Gate	Store	1248	0.0 –1.83	1.83
Closed w/Gate	Closed w/Gate	1251A	0.0 –0.17	0.17
Closed w/Gate	Closed w/Gate	3465	0.0 –1.08	1.08
Closed w/Gate	Closed w/Gate	3468	0.0 –1.44	1.44
Closed w/Gate	Closed w/Gate	3467	0.0 –0.16	0.16
Closed w/Gate	Closed w/Gate	3464	0.0 –0.37	0.37
Closed w/Gate	Closed w/Gate	3656	0.0 –0.48	0.48
Closed w/Gate	Closed w/Gate	3657	0.0 –0.54	0.54
Closed w/Gate	Store	3659	1.2 –3.2	2.00
Closed w/Gate	Store	3659A	0.0 –0.56	0.56
Closed w/Gate	Closed w/Gate	3620	0.0 –1.65	1.65
Sub-total Storage – Currently Restricted	N/A	N/A	N/A	**31.14**

Table 22. Nonsystem roads to be decommissioned

Existing Road Status – Closed	Proposed Road Status - Decommission	Roads	Beginning Mile Post	Proposed Action Miles
Undetermined	Not Needed	1236UA	0.0	0.37
Undetermined	Not Needed	1237UZ	0.0	0.16
Undetermined	Not Needed	1237UAB	0.0	0.04
Undetermined	Not Needed	1239UA	0.0	0.17
Undetermined	Not Needed	3468UA	0.0	0.21
Undetermined	Not Needed	3659UA	0.0	0.16
Undetermined	Not Needed	3659UB	0.0	0.19
Total	N/A	N/A	N/A	**1.30**

Appendix C – Design Features and Mitigations

The following design features are intended to minimize or mitigate effects to specific resources that may be caused by project activities. In some cases, specific forest plan standards or guidelines are listed to ensure certain resources are protected as intended by the forest plan.

Please refer to the forest plan for details.

Fire and Fuels

The purpose of the design features for the fire and fuels resource is to ensure that fire management activities related to the proposed action have a high probability of success in meeting the silvicultural, air quality, and fuels objectives, as well as being implemented in a safe and efficient manner.

1. Directional felling into the interior of the units would be used to minimize the amount of activity fuels along unit boundaries.
2. To reduce fuel loading, tops and limbs would be yarded in harvest units where soil conditions allow.
3. Slash pullback, concurrent with harvest, would be done to minimize slash outside of the unit.
4. Slash piles should be constructed free of stumps, soil, snow, and non-woody organic material, and should be burned as dry as practical to enhance efficient combustion.
5. Prescribed burning may occur at any time of year, as prescription parameters, burn windows, and smoke emissions restrictions permit.
6. All burning activities would be conducted according to the requirements of the Montana/ Idaho Smoke Management Unit guidelines outlined in the Montana/Idaho Airshed Group Operating Guide (2010).
7. Where prescribed fire is used as a treatment method, firelines and fuelbreaks would be constructed as needed, and as determined by fire managers. Topographic and vegetative features of the landscape may also be used for containment of prescribed fires when possible.
8. Schedule of logging will be such that coordination between harvest, burning, and road closure will be timely and efficient. In order to accomplish proposed prescribed burn activities and achieve site preparation requirements most-effectively, logging operations at all units should be completed in such a way that allows them to be released for slash treatment as soon as possible after harvest, and before roads are stored or decommissioned

Watersheds and Aquatic Resources

In addition to the design features listed below, this project also adheres to the following forest plan standards and guidelines.

1. Include all applicable best management practices described in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22). A detailed list of best management practices included with this project can be found in the hydrology section of the project file.
2. Priority road maintenance (including installation of gravel and drainage features such as waterbars, ditch relief culverts, or rolling dips) should occur on National Forest System roads within the Brebner Flat project area. Specifically, roads 1237 (Kelley Creek) and 390, which are the major haul routes, should receive this type of maintenance.

3. No fireline construction or prescribed fire ignition would occur within any riparian habitat conservation area.
4. No thinning would be allowed to occur within the riparian conservation area. No mechanical equipment (excavator, harvester, or skid steer) would be allowed in designated riparian habitat, except at road crossings.

Soils

1. For any units harvested in the winter, equipment will operate on 12 inches of settled snow, or frozen ground.
2. Suspend operations under wet or thawing conditions.
3. Heavily impacted skid trails and landings may be required to be decompacted or scarified following ground based harvest and fuel reduction activities, in order to reduce compaction and potential for erosion.
4. Machinery should avoid excessive pivoting in order to prevent soil displacement.
5. Coarse woody debris would be retained on the ground for sustained nutrient recycling in harvest units, consistent with FW-GDL-VEG-03. Units identified that have levels below the guideline recommendation include 23B, 29A-1, 29A-2, 29A-3, 29B-5, 29B-6, 29B-7, 29C, 30A, 30B-1, 30B-2, 31A and 31B. Unit's 19B-2 and 21A are exempt fromthis due to concerns with wildfire in the wildland-urban interface.
6. To provide for leaching of nutrients and maintenance of long-term soil productivity, fine woody debris should be distributed throughout harvest units when conducting vegetation management activities located on nutrient limited rock types (see glossary in the forest plan). This material should remain on site for at least 6 months, during one winter (wet/rainy) season, prior to any subsequent activities such as prescribed burning or mechanical slash piling. Exceptions may occur in areas where a site-specific analysis indicates that leaving fine woody debris untreated would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources. Units that have been identified with nutrient poor rock types are 29C, 32A, 33A, 29A-2, and 29B-5.
7. Ground-based equipment (including grapple piling equipment) should only operate on slopes less than 35 percent to avoid detrimental soil disturbance as defined in forest plan guideline FW-GDL-SOIL-01 (forest plan, page 24).
8. Existing skid trails would be used where possible. All new skid trails would be designated and laid out to take advantage of topography and minimize disruption of natural drainage patterns. Where terrain is conducive, trails would be spaced at least 100 feet or more apart.
9. Where material is available, ground disturbance associated with skid trails would be covered with randomly placed logs (on the contour), slash, or seeded with Forest Service approved seed mix to help increase the microtopography needed to reduce runoff and erosion.
10. Equipment shall not be operated when ground conditions are such that excessive damage will result.
11. The leading end of logs would be suspended during skyline yarding.
12. No yarding would cross designated riparian habitat conservation areas.
13. All temporary roads and excavated skid trails would be rehabilitated (all new construction would be recontoured; existing prisms would be placed in a stable condition through recontouring and/or decompaction) to restore soil bulk density and improve water infiltration and hydrologic connectivity. Units with planned temporary roads that will be rehabilitated as

described are 21B, 21A, 19C, 19B-2, 26B-2, 20A, 20B-1, 11B, 06A, 06B, 13A, 13B, 13C, 08A, 29A-1, 29C, 22B, and 41B.

14. Prescribed burning (pile burning, broadcast burning, and underburning) would occur only when the upper surface inch of mineral soil has a moisture content of 25 percent by weight, or when duff moisture exceeds 60 percent, or when other monitoring or modeling indicates that soil productivity will be protected to minimize soil burn severity.
15. Burn piles would be small and numerous rather than large and few to reduce the amount of area with soil burn severity.

Rare Plants

An overarching project design feature specifies that, if threatened, endangered or sensitive plant species are encountered during project implementation, an agency botanist would be notified so that site-specific measures could be taken in order to maintain population viability. Such measures might include, but would not be limited to:

1. Modifying activity methods to protect rare plants and their habitats or otherwise modifying the proposed activity, and/ or
2. Implementing spatial buffers around plant occurrences.

Provisions for the protection of Endangered Species and settlement for environmental cancellation would be included in all contracts as specified under Timber Sale Contract provisions B6.24, Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources; C6.24#- Site Specific Special Protection Measures; and B8.33, Contract Suspension and Modification.

Table 22. Site-specific design feature for rare plants

Units	Proposed Prescription, Logging System	Species/ Location Details	Design Features/ Comments
29b_5	Clearcut with reserves/ Skyline	One sensitive Mingan moonwort occurrence about 150 feet from NW boundary of Unit 29b_5 & 235 feet from FS Rd. 1235	Buffer and flag for visibility/ avoidance. No concerns: occurrence is far from proposed activities.

Non-native Invasive Plants

1. Treatment would be implemented in accordance with priorities set by the noxious weed program if new populations of noxious weeds are found. New invader species would be slated for eradication immediately upon discovery. Other weed infestations would be treated according to direction in the St. Joe Noxious Weed Project Final Environmental Impact Statement and Record of Decision, and St. Joe Ranger District priorities.
2. Glyphosate would not be used to treat weeds in the project area.
3. Roads used for timber hauling would be treated with herbicides by the timber sale purchaser before timber haul begins and after timber haul is complete.
4. All equipment taken off roads (includes machinery used in restoration projects, and logging and construction equipment) would be cleaned prior to entering the project area to remove dirt, plant parts, and material that may carry weed seeds. A provision would be included in contracts.
5. Mulching would be done where deemed appropriate by the project administrator and botanist. On-site slash could be used. Contract provisions would be included in contracts.
6. After implementation, project areas would be monitored for new populations of noxious weeds. If new populations are found more intensive surveys would be conducted, sites would be mapped, and treatment would be scheduled.

7. Weed treatments would be monitored for effectiveness.
8. Provisions in the timber sale contract require the purchaser to seed and fertilize areas of soil disturbance such as those associated with skid trails, road construction, road cuts, and landings using a seed mix approved by an agency botanist at the time of contract preparation. Prior to any and all changes to the seed mixes and time of the seeding a district botanist would be notified to approve changes.
9. Weeds would be treated on existing roads to be stored or decommissioned if they are not brushed in prior to road storage or decommissioning.
10. All plant materials used in the project, including grass seed and mulch, would be certified noxious-weed free. Grass seed would be certified, blue-tagged seed.
11. Native plant materials are required to be used in restoration projects (FSM 2070.3, Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials may be substituted that meet Region 1 guidelines (Northern Region Native Plant Handbook, 1995).

Wildlife

1. **Listed and Sensitive Species:** Contract provisions for protection of threatened, endangered, proposed, and sensitive species, and settlement for environmental cancellation would be included. If any such species or significant habitat is discovered before or during project implementation, the sale administrator and the district wildlife biologist would be notified so that if needed, measures could be taken to avoid impacts and meet forest plan standards and guidelines. Measures could include altering or dropping proposed units, modifying the proposed activity, or implementing buffers.
2. **Gray Wolf:** Active gray wolf dens or rendezvous sites identified in or adjacent to proposed activity areas would be spatially and/or temporally buffered as appropriate. No project activities (excluding maintenance and hauling on year-round open road systems) would be allowed within 1 mile of occupied den sites from April 1 through June 30, and from July 1 through August 15 for rendezvous sites. Upon review by the wildlife biologist, these distances could potentially decrease based on topographical characteristics at each site.

3. **Western Toad:** All fish-bearing streams would be buffered by 300 feet on each side to protect western toad. Perennial streams and wetlands larger than 1 acre would be buffered from ground-disturbing activity by at least 150 feet. Smaller springs, seeps, and wetlands would be buffered by at least 100 feet if any were identified near or within harvest units.
4. **Raptor Nests:** A no-activity area of 40 acres would be placed around any newly discovered goshawk nest or any nest that has been active in the past five years. If the nest tree is not roughly centered within the 40-acre no activity area, an additional no activity distance of at least 745 feet (the radius of a 40-acre circle) may be implemented between the nest tree and harvest units to reduce impacts to habitat around the nest site from project activities. The District wildlife biologist would determine if this additional no-activity distance would be implemented based on factors such as topography, the location of the nest tree within the 40-acre nest area, and the distance of the nest tree from private ownership and existing roads.
5. **Post-Fledging Areas:** Project activities would be suspended within post-fledging areas from April 15 to August 15 to promote nesting success and provide forage opportunities for adults and fledgling goshawks during the fledgling dependency period. The units and road activities potentially affected by this design feature are subject to change year to year based on the location of the active nest during the year the activities are to occur. Activity restrictions may be removed after June 30 if the District wildlife biologist determines that a particular nest site is inactive or unsuccessful.
6. **Big Game Security:** To prevent unauthorized motorized access on stored and closed roads, proposed road storage may require obliteration for a distance of 300 feet, a sight-distance, or whatever distance is effective to eliminate motorized access. The amount and type of obliteration required would be the minimum needed to effectively prevent motorized vehicle use. This would vary depending on the slope and vegetation present. A guardrail barricade may be used if it can be placed to effectively prevent motorized access.

   Existing gates would remain in place. Temporary gates would be installed on any road to be used that is not behind a gate and is currently not drivable. During timber hauling the gate would be closed and locked at the end of each day. For other operations, gates would be closed and locked after passage of each vehicle.

7. **Cavity Nesting Species:** Recommendations for retention of snags and snag recruitment levels would be based on forest plan guidelines FW-GDL-VEG-04, 05 and 06 (forest plan, pages 20-21).
8. **Small Mammal Habitat:** In harvest units where slash piles are created, one pile per 5 acres would be left unburned to supply potential forest carnivore rest sites, provide cover for small animals (prey habitat), and serve as potential den sites (IDFG 1995). Piles left should be those closest to standing timber, such as the unit edge or a large cluster of leave trees.

Scenic Resources

1. Treatment unit boundaries would resemble the shape of natural openings in the surrounding area, would not be symmetrical in shape, avoid right angles and straight lines, and follow natural topographic breaks and changes in vegetation, to the extent feasible.
2. Unit boundaries should reduce the hard edges that appear as man-made features on the landscape.
3. Minimize cuts and fills associated with road and landing construction, and recontour and reseed temporary roads, landings, and slash piles when harvest activities are completed.

4. Units 13a, 13b_1, 13b_2, 13c, 19b_2, 19c, and 23a: Retain groups of leave trees to provide vertical structure within the harvest area and break up the opening. These would be both live and dead trees emulating the same structure that would remain after a natural mixed-severity wildfire. These leave trees would have an irregular or uneven distribution and can range from individual trees to groups of trees one quarter to 3 acres in size and may also include leave areas adjacent to unit boundaries. These groups or clumps may take the form of stringers extending up drainages to meet this requirement.
5. Units 01b, 03a, 03b, 06a, 06b, 08a, 08b_1, 08b_2, 09a, 09b, 11a, 11b, 12b, 13a, 13b_1, 13b_2, 13c, 14b, 19b_2, 19c, 23a: Feather all unit boundaries; i.e., where units or portion of units are adjacent to denser forest, the percentage of trees removed within the transition zone will be progressively reduced toward the outside edge of the unit. In addition, vary the width of the transition zone (USDA Forest Service 2011).
6. Unit 01b: Retain adequate trees along the northern boundary of this unit to avoid creating a visible break in the existing ridgeline vegetation as seen from Forest Highway 50 west of Avery, Idaho.
7. Unit 14b: Meander the side and bottom boundaries of this unit. Feather side and bottom boundaries. Retain trees along the downhill side of FSR 1433 to soften the linear nature of the upper boundary of the unit.
8. Units 03a, 03b, 09a, 09b, 13a, 13b_1, 13b_2, 13c: Locate all new permanent road construction in these units to take advantage of topographic and vegetation screening, retaining trees in order to screen the visible effects of these roads from these routes. Minimize the clearing width to that necessary to construct the road.
9. Locate all new temporary road construction in these units to take advantage of topographic and vegetation screening as feasible. All temporary roads will be fully recontoured and reseeded once harvest operations are completed.
10. Road cuts and fills will be sloped to accommodate grass seeding and natural revegetation. Tree planting will include placement on fill slopes to reduce color contrasts (USDA Forest Service, 2011)

Recreation Resources

1. Existing dispersed camp sites impacted by harvest activities or road modifications should be restored or reconfigured to provide a similar space for dispersed camping. See Figure 2. Brebner Flat Dispersed Recreation Opportunities in the recreation report of the project file.

2. Plowing of groomed routes should only occur before December 15 or after March 15 to allow for grooming of motorized snow routes. Should plowing be necessary between December 15 and March 15 an area should be plowed to provide for parking at the end of the plowed route. See Figure 3. Brebner Flat Groomed Snow Routes in recreation report of the project file.

Appendix D – Past, Present and Reasonable Foreseeable Activities Considered for Cumulative Effects

The forests in the Brebner Flat project area are not static, they constantly change. Some of the changes result from natural forces like fire, flood, and forest succession. Other changes result from people using and managing the forests.

Analysis

Table 23. Past, present, and reasonably foreseeable activities considered

Action	Past	Present	Future	Notes
Activities on National Forest System Lands				
Wildfires	X			
Fire suppression	X	X	X	
Road construction	X	X		
Road decommissioning	X	X		
Aquatic habitat improvement in	X	X		
Herbicide spraying for noxious weeds	X	X	X	
Timber harvest & associated slash treatments	X	X		
Slash treatments	X	X		
Prescribed burning of shrub fields for wildlife browse improvement	X	X		
Tree planting	X	X		
Gopher control baiting	X			
Precommercial thinning	X	X		
White pine pruning	X	X		
Road maintenance	X	X	X	
Public firewood gathering	X	X	X	
Public use of motorized vehicles (on roads, trails, over snow)	X	X	X	
Other public recreational activities such as berry picking, hunting, camping, hiking, etc.	X	X	X	